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AVISTA CORPORATION, Petitioner v. U.S. BUREAU OF INDIAN AFFAIRS, Respondent	:	Docket No. DCHD-2007-01 (FERC Docket Nos. 2545,12606) Spokane River and Post Falls Hydroelectric Projects
STATE OF IDAHO, Intervenor	:	
COEUR D'ALENE TRIBE, Intervenor	:	
UPPER COLUMBIA RIVER GROUP OF THE SIERRA CLUB, Intervenor	:	

DECISION

Administrative Law Judge
Andrew S. Pearlstein

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DECISION

Introduction and Summary

The Avista Corporation ("Avista") has applied to the Federal Energy Regulatory Commission ("FERC") to re-license its Post Falls Hydroelectric Development ("HED"), located on the Spokane River (the "River"), approximately 9 miles downstream from the River's source, the outlet of Coeur d'Alene Lake (the "Lake"). The Lake lies in a valley in the northern Idaho panhandle, surrounded by the forested ridges of the northern Rocky Mountains, interspersed, on the west, with breaks of the Rathdrum prairie grasslands. The entire basin of the Lake, including its tributaries and outlet, the Spokane River, comprise the ancestral homeland of the Coeur d'Alene Indian Tribe (the "Tribe"). The Tribe now occupies the Coeur d'Alene Indian Reservation (the "Reservation"), consisting of approximately 359,000 acres, including the southern third of the Lake and the lower reaches of one of its major tributaries, the St. Joe River. The operation of the Post Falls HED (the "Project") controls the level of the Lake for part of each year, primarily by maintaining it at a higher than natural elevation during the summer months.

This Decision focuses on alleged environmental effects and impacts of the continued operation of the Post Falls HED on the Reservation, where the parties have raised disputed issues of material fact relating to conditions proposed by the Bureau of Indian Affairs ("BIA") to monitor and mitigate those alleged impacts. Those effects include impacts or alleged impacts on water quality, fisheries, aquatic vegetation, wetlands, erosion, and the Tribe's cultural resources. Avista generally denied that the Project causes adverse impacts to the Reservation, while BIA and the Tribe generally alleged that the Project does cause such impacts.

This Decision finds that several of the disputed factual issues are resolved by the evidence in favor of Avista's position, while others are resolved in favor of the position of BIA and the Tribe. An abbreviated summary of the ultimate findings of fact with respect to each of the issues identified for hearing follows.

Issue 2: (a). The Project is responsible for about 50% of erosion in the lower tributaries, and 30% in the Lake. (b). The Project increases boating activity on the Reservation.

Issue 3: (a). The Project affects plant growth and distribution in the shallow southern end of the Lake; and increases temperature and reduces dissolved oxygen in that area. (b). The Project does not significantly increase eutrophication in the Lake as a whole. (c). The Project has no effect, or a negligible effect, on the amount of metals that dissolve in the Lake. (d). The Project does not have potential effects on the metal parameters listed, but may have effects on the organic parameters in the southern end of the Lake.

Issue 4: (a). The Project has caused an increase in pothunting of cultural resources on the Reservation. (b). Avista's survey of cultural resources was adequate to identify those resources for the intended purposes. (c). The Project may affect cultural resources within the 100-foot buffer zone.

Issue 5: The Project has had only minor impacts on the decline of native salmonid fish in the Lake, that are dwarfed by the devastating impacts of non-Project factors, primarily the introduction of non-native species, and the degradation of tributary spawning habitat.

Issue 6: (a). The Project is a cause of the increase in growth and spread of Eurasian watermilfoil in the Lake. (b). It is not feasible to totally eradicate Eurasian watermilfoil from the Lake, but it is feasible to control it in a limited area such as the south end of the Lake on the Reservation.

Issue 7: (a)(1). The Project has reduced the total acreage of wetlands on the Reservation, and has impaired the functioning of those wetlands. (2). The Project has reduced the occurrence of certain culturally important plants. (3). Human activities unrelated to the Project have not reduced wetlands on the Reservation. (4). The wetlands on the Project are in equilibrium with the summer Lake level, but not with natural ecological processes.

These findings of fact will now be used by BIA in prescribing conditions for Avista's license, within the FERC licensing process, to appropriately address the environmental effects and impacts of the Project.

Proceedings

This expedited trial-type proceeding arises under Section 241 of the Energy Policy Act of 2005, Pub. L. No. 109-58, § 241, 119 Stat. 594, 674-75 (Aug. 8, 2005)

("EPAct"), codified at 16 U.S.C. §§ 797(e), 811, and the underlying procedural regulations published in 70 FR 69,804 (Nov. 17, 2005) (promulgated in 43 CFR Part 45). Section 241 amends sections 4(e) and 18 of the Federal Power Act ("FPA"), amended and codified at 16 U.S.C. §§ 791-823d. Those sections provide certain federal agencies authority to include conditions and/or fishway prescriptions in any hydroelectric license issued or re-issued by FERC. See 16 U.S.C. §§ 797(e), 811. The EPAct creates a new administrative hearing procedure, within the FERC application review process, to resolve disputed issues of fact material to those proposed conditions.

Under section 4(e), the Secretary of the Department of the Interior ("DOI"), may establish conditions deemed necessary for the protection of Indian reservations and public lands to be included in a hydroelectric license. See 16 U.S.C. § 797(e). Pursuant to section 241 of the EPAct, "[t]he license applicant and any party to the proceeding shall be entitled to a determination on the record, after opportunity for an agency trial-type hearing of no more than 90 days, on any disputed issues of material fact with respect to such conditions." 16 U.S.C. § 797(e).

Avista's current license to operate the Post Falls HED expires on August 1, 2007. Avista filed its application to FERC for a renewed license for the Post Falls HED on July 1, 2005. Avista began consultation with interested stakeholders as early as 1999. In preparation for the license proceeding, in 2002 Avista requested, and FERC approved, use of the Alternative Licensing Process ("ALP"), a collaborative process designed to facilitate resolving licensing issues among all interested parties. The active interested parties in the ALP for licensing Post Falls HED included Avista, BIA, the Tribe, the Idaho Department of Fish and Game, the Upper Columbia River Group of the Sierra Club, and local municipalities. As part of that process, the interested parties formed "work groups" to define the issues, review and approve study plans, and to develop proposed environmental mitigation measures. For these purposes, the following work groups met regularly over the next four years: water resources; fisheries; terrestrial resources; recreation, land use, and aesthetics; and cultural resources.

Avista's consultants and contractors conducted much of the scientific research and field work as directed by the work groups, which now comprise much of the evidence in the record of this proceeding. The Tribe's Department of Natural Resources also conducted many studies of water quality, wetlands, and fisheries that

were admitted in evidence. Most of the witnesses at the hearing were either Avista's consultants, or employees of the Tribe.

On July 18, 2006, DOI filed preliminary conditions on behalf of the Bureau of Indian Affairs ("BIA') pursuant to section 4(e) of the FPA for inclusion in the Post Falls HED licensing proceeding. On August 17, 2006, Avista filed a request for hearing on disputed issues of material fact with respect to six of the preliminary conditions filed by DOI. In its request for hearing, Avista identified 38 proposed issues of disputed material fact for hearing. Notices of intervention and responses to Avista's hearing request were then filed by the Tribe, the State of Idaho ("Idaho"), and the Upper Columbia River Group of the Sierra Club ("Sierra Club").

On October 2, 2006, BIA filed an answer responding to Avista's hearing request. In its answer, BIA contended that most of Avista's proposed issues of disputed material fact were inappropriate for hearing because they failed to meet the 43 CFR 45.1(a)(1) requirement that each hearing issue be disputed, material, and factual. BIA also argued that several of Avista's proposed issues were actually questions of policy and/or alternative conditions, and therefore beyond the scope of this proceeding. The Tribe and the Sierra Club also took the position that most of Avista's proposed issues did not meet the requirements to be identified for hearing.

On October 10, 2006, DOI's Office of Environmental Policy and Compliance ("OEPC") referred this matter to the United States Department of the Interior, Office of Hearings and Appeals, Departmental Cases Hearings Division ("OHA"), pursuant to 43 CFR 45.25(a). This case was then assigned to Administrative Law Judge ("ALJ") Andrew S. Pearlstein. DOI's hearing regulations promulgated pursuant to the EPAct are found in 43 CFR Part 45. The purpose of the hearing is to resolve disputed issues of material fact with respect to the Section 4(e) preliminary mandatory conditions that DOI has developed for inclusion in the hydropower license for the Post Falls HED. See 43 CFR 45.1(a)(1). The term "material fact" is defined by the regulations as "a fact that, if proved, may affect a Department's decision whether to affirm, modify, or withdraw any condition or prescription." 43 CFR 45.2.

On October 13, 2006, the ALJ issued a docketing notice and scheduled an initial prehearing telephone conference for October 30, 2006. Between October 13 and the October 30 conference, Avista, BIA, and the Tribe filed and exchanged a series of discovery motions and responses, objections to discovery, proposed stipulations, and other prehearing motions. Most significant were motions by BIA and the Tribe,

joined by the Sierra Club, to dismiss most of Avista's proposed disputed issues of material fact. Avista responded in opposition to those motions. BIA and the Tribe also filed motions seeking an order determining that Avista must bear the burden of proof to establish its positions on the disputed issues of material fact in this proceeding. Avista responded in opposition, contending that BIA should bear the burden of proof. By Order dated October 24, 2006, the ALJ advised the parties that the issues raised in the above-referenced filings would be addressed during the prehearing telephone conference.

In accord with 43 CFR 45.40(a), the ALJ convened an initial prehearing conference on October 30, 2006. Representatives of all parties participated. We discussed various matters including the burden of proof, discovery, scheduling, and narrowing or identifying disputed issues of material fact for hearing. On November 1, 2006, I issued a Prehearing Conference Order identifying the disputed issues of material fact for hearing, and establishing that the ultimate burden of proof or persuasion rests with Avista in this proceeding. The Prehearing Conference Order also established a schedule, consistent with the various time limits set forth in 43 CFR Part 45, for discovery, the filing of written direct testimony, a supplemental prehearing telephone conference, a site visit, the hearing, and the filing of post-hearing briefs.

During the month of November 2006, the parties engaged in discovery and submitted the prepared direct testimony of their witnesses in accordance with 43 CFR 45.52 (a)(1)(iii), and the Prehearing Conference Order. On November 27, 2006, the parties filed a Stipulation and Protective Order governing their handling of sensitive and confidential information in this proceeding. The parties also filed several other stipulations of fact, and stipulations to withdraw proposed issues from the hearing request.

On November 28, 2006, Avista filed a motion to compel the production of certain BIA documents, or to further support the claimed privilege, for some 524 documents BIA had listed in its privilege log. BIA filed a response to Avista's motion to compel on November 29, 2006, in which BIA agreed to produce some of the documents listed in its privilege log. On November 30, 2006, I issued an Order Establishing Guidelines for Resolution of the Discovery Issues Raised by Avista Corporation's Motion to Compel Production of Documents. Pursuant to that Order, BIA further reviewed the documents listed in its privilege log and ultimately disclosed approximately 50 additional documents to Avista.

On December 1, 2006, the ALJ met with representatives of each of the parties in Spokane, Washington, for the scheduled site visit. We first traveled in a van to view the Post Falls HED in Post Falls, Idaho. Next, we drove to Spokane Point on the western shore of Coeur d'Alene Lake and boarded a boat for a tour of the southern end of the Lake and the lower reach of the St. Joe River. The site visit, in addition to being highly enjoyable, was helpful in providing the ALJ and those in attendance with a visual frame of reference to aid in better understanding the evidence produced at the hearing.

The hearing in this matter convened in Spokane, Washington, on December 4, 2006, and continued through December 8, 2006, closing the hearing record on that date. Avista produced 10 witnesses. BIA produced 14 witnesses, two of whom testified jointly also on behalf of the Tribe. The record of the hearing consists of the stenographic transcript of 5 days of hearing; 95 exhibits submitted by Avista (designated "A" followed by the exhibit number); 283 exhibits submitted by BIA ("B"); and 107 exhibits submitted by the Tribe ("T").[1] By agreement, all exhibits were deemed received into evidence unless a specific objection was upheld by the ALJ.[2] Idaho and the Sierra Club did not offer any evidence for the record, and engaged in only minimal cross-examination of a few witnesses. Avista, BIA and Tribe jointly, and the Sierra Club, filed post-hearing briefs, including proposed supporting and ultimate findings of fact, on December 22, 2006. Pursuant to leave granted by the ALJ, BIA and Tribe jointly, and Avista, filed reply briefs on December 29, 2006.[3]

Tribe's Motion to Substitute an Exhibit

On January 3, 2007, the Tribe filed a Motion to Reconsider In Part the December 28, 2006, Order Clarifying Designation of Exhibits and Denying Adding

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[1] In this Decision, the stenographic transcript will be cited as "Tr." followed by the page number(s), e.g., "Tr. 100." The five volumes were paginated consecutively, so the volume will not be cited. Exhibits will be cited as "Ex." followed by the party designation and the number, e.g., "Ex. A-100," and, if applicable "at" the cited page number(s). The written direct testimony of Avista's witnesses are Exs. A-1-10; those of BIA's witnesses are Exs. B-1-14; and the Tribe's are T-1 and T-3. Citations to the record are representative, but not intended to be exhaustive. Quite a few exhibits have duplicate or triplicate designations since they were introduced by two or three parties. Generally only one designation, that of the preparer of the exhibit, will be cited.

[2] The only exhibits excluded from the record on this basis were Exs. A-91 and T-105.

[3] Pursuant to the EPAct and the hydropower regulations, this Decision is due the earlier of 30 days after the close of the hearing or 90 days after issuance of the referral notice. 43 CFR 45.60(a). That renders it due January 8, 2007, four business days after receiving the reply briefs.

New Exhibit. Specifically, the Tribe requested leave to add The Tribe's Amended Additional Information/Study Requests ("AIR") filed with FERC on September 27, 2005, as Exhibit T-107 to the Hearing record, as an updated, corrected version of the inadvertently included Exhibit B-71. When I issued the previous order denying adding a new exhibit, the nature of the proposed clarification was not apparent, and the Tribe had not submitted a copy of the exhibit for review. A copy of proposed Exhibit T-107 was submitted with the Motion for Reconsideration. The proposed exhibit does in fact have the same title as the line entry for Exhibit B-71 on the BIA exhibit list. The submitted Exhibit B-71 is a previous version of the AIR, with the same title minus the word "Amended." As a result, it is apparent BIA and the Tribe inadvertently physically included the wrong document in the exhibits submitted at the hearing.

Avista responded to the Motion for Reconsideration on January 4, 2007, arguing that it would be prejudiced if the document was received into the record after the close of the hearing because it could have changed Avista's strategic decision not to cross-examine Dr. Jill Wagner. Dr. Wagner's direct testimony at Exhibit B-7 clearly refers to the intended document, as it is identified in BIA's exhibit list. Exhibit T-8 contains substantially similar information. Avista has not specifically indicated how it was prejudiced by not cross-examining Dr. Wagner with respect to these exhibits, and I do not perceive such prejudice from the record. Since BIA and the Tribe had listed the intended exhibit accurately in the BIA exhibit list, it was previously available to Avista in the FERC record, it was referred to in the prefiled testimony, and its contents can largely be found elsewhere in the record, I do not consider this adding evidence after the record has closed, prohibited by 43 CFR 45.58(b). Therefore, Exhibit T-107 will be admitted and added to the hearing record.

Description of Project and Affected Area

This section of the Decision will describe the Post Falls HED, its operation, and area affected by the Project, in some detail. This should reduce the need to repeat these undisputed facts in the Findings of Fact and Discussion addressing each of the individual issues. Most of this information is found in Avista's Preliminary Draft Environmental Assessment ("PDEA") for the Spokane River Project, prepared in July 2005 for its FERC Application No. 2545. (Exs. A-12, B-35).

Post Falls HED

Avista is an investor-owned utility that operates the Spokane River Project, among other hydropower and energy-generating facilities in eastern Washington and northern Idaho. It is the successor to Washington Water Power Company and its predecessors that operated the Spokane River HEDs. The Spokane River Project consists of five HEDs on the Spokane River. This proceeding focuses on Post Falls HED, which is located in Post Falls, Idaho, on the Spokane River approximately 9 miles downstream from the River's source, the outlet of Lake Coeur d'Alene. Due to its location in a different state and its differing impacts from the other four developments, Avista has filed two separate FERC license applications: one for Post Falls HED, and another for the other four developments. Avista also owns and operates Upper Falls and Monroe Street HEDs, located on the Spokane River in downtown Spokane, Washington, 28 miles downstream; Nine Mile HED another 16 miles downstream; and Long Lake HED, another 24 miles downstream. Avista operates these five Spokane River HEDs in a coordinated manner to generate electricity. They have a total generating capacity of 137 megawatts ("MW").

Post Falls HED includes three dams, in the north, middle and south channels of the River, between natural islands. Post Falls HED also includes a six-turbine powerhouse in the middle channel, with a total nameplate capacity of 14.75 MW, and a total hydraulic capacity of 5400 cubic feet per second ("cfs"). This development impounds a reservoir that includes the 9 uppermost miles of the Spokane River; Coeur d'Alene Lake; lower reaches of the Coeur d'Alene, St. Joe, and St.Maries Rivers; and a series of lateral lakes along the lower reaches of those latter rivers. As further described below, Post Falls HED maintains the level in these bodies of water some 8 feet higher than under natural flow conditions during the summer and early fall, thus storing some 223,100 acre-feet of water.

Coeur d'Alene Lake and the Reservation

Coeur d'Alene Lake is a natural lake located in the northern Idaho panhandle, mostly in Kootenai County, with the southern end extending into Benewah County. The Lake receives approximately 90% of its surface inflow from two major tributaries, the Coeur d'Alene and St. Joe Rivers, which drain the Bitterroot Mountains and associated ranges to the east, where they form the border with Montana. The mountains reach elevations of around 7000 feet on the Montana

border. The St. Maries River is a major tributary to the St. Joe River, which enters the southeastern end of the Lake. The Lake has numerous smaller tributaries as well.

Coeur d'Alene Lake is relatively long and narrow, extending some 25 miles from north to south, with a width in most areas varying from 0.5 to two miles. There is a wider northern lobe about 8 miles across from west to east. At summer full pool, at elevation 2128 feet, the lake has a surface area of approximately 34,180 acres (129 square kilometers), a volume of about 2,300,000 acre-feet, and a maximum depth of 209 feet. At minimum pool, elevation 2120 feet, the Lake surface area would be reduced to 29,120 acres. (Ex. A-33 at 34). The lateral lakes along the Coeur d'Alene and St. Joe Rivers comprise an additional 5900 acres of surface area. At low pool, the lateral lakes would cover 1995 acres. The drainage area upstream of Post Falls HED encompasses approximately 3780 square miles. (Exs. A-12, B-35 at 3-3).

Coeur d'Alene Lake was formed at the close of the last Ice Age, about 12,000 years ago, when repeated floods built up a natural dam or restriction at the current outlet, backing water into the St. Joe River valley. The outlet restriction is at an elevation of 2119.9 feet, which controls the Lake's natural low level at that elevation. The Lake lies near the western edge of the Rocky Mountain geologic province. The bedrock in the mountains east of the Lake consists mostly of ancient continental rocks, mostly granite, schist and gneiss, over two billion years old. The Spokane River outlet flows eastward where it enters the Columbia Plateau province near the Washington border. The Columbia Plateau consists of extensive Miocene (about 25 million years old) basalt flows, extending across central Washington. The Spokane River flows into the Columbia River, or Lake Roosevelt, the reservoir impounding the Columbia created by Grand Coulee dam, 111 river miles from the River's headwaters at the outlet of Coeur d'Alene Lake.

The City of Coeur d'Alene, Idaho, with a population of about 30,000, the seat of Kootenai County, is located at the northern end of the Lake. The population of Kootenai County is about 117,000 persons (2003). The northern part of the Lake near the city of Coeur d'Alene is characterized by more extensive residential and commercial development than the southern part. Parts of the shoreline, especially in the central and southern sections, are undeveloped and forested, although there are large areas of grazing and agricultural land surrounding the Lake as well. The Lake is a popular recreation destination, with commercial marinas and private boat docks located throughout the shoreline. It is used by the public mainly in the summer for boating, fishing, and other water-oriented recreational activities.

The climate is relatively warm and dry in the summer. At the city of Coeur d'Alene, most of the 25 inches of annual precipitation falls, in the form of both rain and snow, in spring, fall, and winter. Farther east, the mountainous Coeur d'Alene and St. Joe River watersheds are much cooler and wetter, with most of the precipitation falling in the form of heavy winter snows. There is usually a heavy snowpack in the mountains throughout the winter and early spring above 4500 feet in elevation.

The Coeur d'Alene River basin is one of the largest areas of historic mining operations in the world. The main mining district, surrounding Kellogg, Idaho and neighboring towns on the South Fork Coeur d'Alene River, known as the "Silver Valley," was a major producer of silver, lead and zinc from the 1880's until the late 1960's. The mining companies discharged mine tailings and wastewater highly enriched in silver, lead, zinc, cadmium, and other metals directly into the South Fork of the Coeur d'Alene River or on its banks. It is estimated that some 75 million tons of contaminated sediments have washed into Coeur d'Alene Lake, covering some 85% of the Lake's bottom with metal-enriched sediments. The metals' concentration in the water column has been declining since the 1980's, when EPA began remedial action at the Bunker Hill Superfund Site in the Silver Valley area. Metal concentrations in sediments are much higher at the mouth of the Coeur d'Alene River and the northern part of the Lake, in accord with the prevailing northward flowing current in the Lake, than are the metal concentrations in the southern part of the Lake. The water quality in the Lake has also been affected by past extensive logging in the basin, as well as agricultural practices, road-building, commercial and residential development.

The Reservation for the Coeur d'Alene Tribe consists of approximately 359,000 acres, including the approximate southern third of Coeur d'Alene Lake. The aboriginal homeland of the Tribe, the Schitu'umsh as pronounced in the Tribe's traditional language, encompasses a much larger area, about 5 million acres, essentially the entire Spokane River drainage basin. (Exs. A-21, B-66 at 2). Coeur d'Alene Lake was the heart of the Tribe's homeland and the source of much of its sustenance and cultural traditions. There are numerous Tribal archaeological sites and artifacts surrounding the Lake, and along the St. Joe River on the Reservation. President Ulysses Grant established the Reservation by proclamation in 1873, and it was ratified by Congress in 1891. As confirmed by the U.S. Supreme Court in Idaho v. United States, 233 U.S. 262, 265 (2001), the United States government holds title, in

trust for the Coeur d'Alene Tribe, to the submerged lands within the boundaries of the Reservation.

The State of Idaho holds title to Heyburn State Park, consisting of approximately 6775 acres on the shoreline in the southwest corner of the Lake, surrounded by the Reservation. It was transferred to the State by an act of Congress in 1911. Within the State Park boundary are Chatcolet and Benewah Lakes, two of the lateral lakes along the lower St. Joe River.[4] Heyburn State Park has marina and camping facilities, and provides public access to the Lake.

The physical character of the Lake and its tributaries in the southern Reservation area is quite different than that in the northern part of the Lake. The northern part of the Lake is characterized by relatively steep sloping rocky shorelines. It has all the deepest areas of the Lake, in most areas well over 100 feet deep. The southern half of the Lake is characterized by relatively shallow waters, well under 100 feet deep, including the deltas of the major tributaries, the Coeur d'Alene and St. Joe Rivers. The Coeur d'Alene River is just north of the Reservation boundary. However the lower reaches of the St. Joe, and its tributary, the St. Maries, are within the Reservation. The lower reaches of the St. Joe River are confined by natural levees, parts of which have been further built up by humans. Outside the levees are a series of shallow lateral lakes, now usually connected to the main body of the Lake during high summer lake levels. The major lateral lakes are, in the north side of the St. Joe levees, Round Lake and Goose Heaven Lake (usually mostly wetland); and, on the south, Hepton, Benewah and Chatcolet Lakes. When Coeur d'Alene Lake is at 2128 feet, the slack water extends over 30 miles up the Coeur d'Alene and St. Joe Rivers.

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[4] The Tribe apparently contests Idaho's title to the bed and banks of the lakes adjacent to the lands in Heyburn State Park. I do not presume to resolve any legal dispute, but only cite the statement in Idaho v. Coeur d'Alene Tribe, 814 F.2d 1288, 1290 (9th Cir. 1987), that "[t]he park includes within its boundaries Chatcolet Lake." Maps in evidence show the park boundary as running down the middle of the lower St. Joe River channel. (See, e.g., Ex. A-26, Fig. 1-1 at 1-3, enlarged as Ex. A-80). The facts relevant to the issues involving Chatcolet and Benewah Lakes will nevertheless be provided in this Decision, as those lakes are adjacent and ecologically connected to the Reservation lands and waters. Any extant legal dispute concerning title to those lakes is outside my jurisdiction, but BIA, FERC, and other involved agencies may apply the facts concerning the lateral lakes in fashioning the final Section 4(e) conditions and in further processing of Avista's application for its license for Post Falls HED.

Operation of the Project

The operation of Post Falls HED does not raise the level of the Lake higher than it would reach under natural conditions, but it maintains a higher than natural level throughout the summer and most of the fall. In other words, the Project delays the natural recession of the Lake by several months. Post Falls HED was built in 1906 and began controlling the level of Coeur d'Alene Lake in 1907. From that year until the 1940's, the summer lake level was maintained at 2126.5 feet. Since the late 1940's it has been maintained at 2128 feet. Thus, for all intents and purposes, the Project has been in operation continuously for the past 100 years.

For purposes of considering the issues and evaluating the evidence in this proceeding, it will be necessary to compare the effects of operation of the Project, or "maintaining the summer Lake level," with the "natural hydrograph," or the fluctuations of the Lake level that would occur under natural conditions, without operation of the Project. Avista has considered operating Post Falls HED in accord with the natural hydrograph as an alternative in the FERC licensing process. It was also evaluated as an alternative in the PDEA. Under the natural hydrograph scenario, Post Falls HED would be operated in a manner to allow the Lake level and River flows to be determined solely by inflow into the Lake and outflow at the Lake's natural outlet restriction.

As stated in the PDEA, however, operating at the natural hydrograph "is not considered a reasonable alternative * * * because the overwhelming majority of stakeholders participating in the ALP [Alternative Licensing Process] do not view it as a reasonable alternative. Additionally * * * this scenario would have adverse socioeconomic effects that would more than offset any gains to some resources." (Exs. A-12 at 3-23). If Avista operated Post Falls HED at the natural hydrograph it would lose only one MW of electric power generating capacity at Post Falls HED and 3 MW throughout the entire Spokane River Project. Avista maintains the Lake level apparently mainly for the benefit of the northern lakeshore community and recreational boating interests. Although consideration of operating the Post Falls HED at the natural hydrograph as an alternative is outside the scope of this proceeding, comparing operation of the Project with the natural hydrograph, in the context of the issues identified for hearing, will be necessary in order to isolate and assess the effects and impacts caused by operation of Post Falls HED.

In its pending FERC application, Avista proposed to continue operating the Post Falls HED, under a new license for a term of at least 40 years, in essentially the same manner that it has been operated for the past 100 years (about 60 years at the current summer pool level). Under this system, Avista waits until the natural spring freshet in the Lake, or maximum high water level, subsides to 2128 feet above sea level. Depending on the amount of precipitation and runoff in the basin that year, this usually occurs between late May and late June. Avista then maintains the Lake at this elevation until around September 15, when it begins releasing flows that draw down the Lake level about 1.5 feet per month. Under the natural hydrograph, the Lake level would drop steadily from its spring high in May, which can vary from 2128 to as high as 2136 feet in a wet year, to a summer low at or near 2120 feet by late July or August. By late December, the Lake's natural level would usually rise a little to around 2122 feet, where it would then generally coincide with the level reached by Avista's releases. Post Falls HED then does not control the Lake level from January until the spring freshet subsides to 2128 feet in late May or June; hence the Lake level follows the natural hydrograph during the winter and most of the spring. Attached as Appendix A to this Decision is a figure with graphs comparing Lake elevations under Project operations with the natural hydrograph in wet, dry, and normal precipitation years. (Ex. A-26 at Figure 1-2 at 1-4).

The operation of the Post Falls HED thus creates the largest difference from the natural Lake level in August, when the Lake is some 7 to 8 feet higher than it would be under the natural hydrograph. In a normal year, the Project maintains the Lake level at least 6 feet higher than the natural elevation from July into October, and controls the level significantly for more than 6 months. Maintaining the summer lake level also inundates an average of at least 8567 acres in August that would not be inundated under the natural hydrograph.[5] Due to the relatively shallow depths in the southern end of the Lake, including the Coeur d'Alene Tribal Reservation, the effects of maintaining the summer Lake level are more pronounced there than in the northern part of the Lake. About 4000 acres on the Reservation are inundated by operation of the Project at full pool that would otherwise be drained or emergent for at least part of the summer. (Exs. A-12 at 3-28; B-66 at 4, 50-54).

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[5] The figure for total inundated acres is somewhat in dispute due to various interpretations of the bathymetric data for the Lake. This is the lowest of the parties' three estimates, by Avista. This issue will be addressed further in relation to Issue 3(a) concerning plant growth and distribution, and Issue 7(a)(1) concerning wetlands acreage.

Issues of Material Fact Identified for Hearing

In the November 1, 2006, Prehearing Order I certified the disputed issues of material fact for hearing. The issues were reorganized and re-designated from the list as proposed by Avista, by grouping them based on the preliminary section 4(e) condition to which each relates. Some of Avista's proposed issues were adopted verbatim and some were combined or restated.

Issues not identified for hearing were eliminated because they addressed questions of policy, proposed alternatives, or were not disputed. On November 24, 2006, Avista and BIA filed a stipulation, agreed to by all parties, withdrawing a number of proposed issues which I had excluded as not genuinely disputed. Also, on November 24, 2006, Avista filed a stipulation and notice of withdrawal, eliminating one issue that had been certified for hearing in my Prehearing Conference Order.

The remaining disputed issues of material fact, which were identified in the Prehearing Conference Order and addressed at the hearing are listed below. Each issue or group of issues relates to one of BIA's preliminary section 4(e) conditions and addresses one of six related areas of alleged environmental effects or impacts[6] of the Project. Those alleged impacts concern shoreline erosion, water quality, cultural resources, salmonid fisheries, aquatic weeds, and wetlands. Accordingly, the disputed issues of material fact are listed as follows.

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[6] As defined in one of Avista's exhibits, a Draft Report on Water Quality Issues (Ex. A-31 at ii), for the purposes of this Decision, "effects" will be considered to be any change in the affected resource or parameter caused by the Project, no matter how small, while "impacts" are those effects that adversely affect the utility or beneficial use of the resource or parameter.

Issue No. 2.[7] Coeur d'Alene Lake and Tributary Shoreline Erosion Control

a. What is the proportionate contribution to shoreline erosion on the Reservation within the Project boundary from natural erosion processes, waves from motorized boats, and effects from Project operations to maintain the summer Lake levels?

b. Whether operating the Project to maintain the summer Lake level causes the amount of boating activity on Coeur d'Alene Lake and its tributaries within the Reservation and the Project boundary to increase.

Issue No. 3. Water Quality Standards and Water Quality Monitoring

a. Whether operating the Project to maintain the summer Lake level creates conditions in the Lake that affect plant growth and distribution, including effects relating to: 1. Temperature; and

2. Dissolved oxygen.

b. Whether operating the Project to maintain the summer Lake level causes significant increases in nutrient levels in the Lake, resulting in an increase in overall nutrient loading (eutrophication).

c. Whether Project operations to maintain the summer Lake level have no effect, or a negligible effect, on the amount of metals that dissolve in the Lake.

d. Whether operating the Project to maintain the summer Lake level has any potential effect on the parameters/substances listed in Condition 3(b)(4)-(6) as areas of further study.

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[7] In the Prehearing Conference Order "Issue No. 2," was referenced as "Condition No. 2." For the purposes of this Decision, the issues will be designated by the Issue number and subparagraph, e.g., "Issue 2(a)." There is no listed Issue 1 because Avista's proposed Issue 1 was excluded as inappropriate for hearing as too broad and subsumed by the subsidiary issues. However, the parties were not precluded from presenting arguments in their briefs on proposed Issue 1, which poses "whether operating the Project to maintain the summer lake level has caused any significant adverse impacts to the environmental and cultural resources on the Reservation within the Project boundary."

Issue No. 4. Protection of Cultural Resources

a. Whether Project operations to maintain the summer Lake level have caused an increase in collecting, scavenging, and looting (also known as pothunting) of cultural materials on the Reservation.

b. Whether Avista's survey, inventory, and evaluation of cultural resources on the Reservation was adequate to identify those cultural resources as intended by the purpose of the survey.

c. Whether Project operations to maintain the summer Lake level have any effect on cultural resources within the 100-foot buffer zone required by Condition No. 4.

Issue No. 5. Salmonid Fisheries

a. Whether Project operations to maintain the summer Lake level have adverse impacts on native fish in the Lake, including impacts resulting from:

1. shoreline erosion;
2. warming and converting the lower tributaries to slow moving waters;
3. affecting the temperature of Lake waters; and
4. causing higher levels of dissolved oxygen;

also including:

5. Whether these impacts are due to other non-Project factors; and
6. Whether Project operations have caused an increase in the population of non-native fish in the Lake or its tributaries.

Issue No. 6. Aquatic Weed Management

a. Whether operating the Project to maintain the summer Lake level is a cause of the increase in growth of exotic and noxious aquatic weeds, including Eurasian

watermilfoil, in the Lake.

b. Whether it is feasible to eradicate Eurasian watermilfoil from the Lake.

Issue No. 7. Wetland and Riparian Habitat Replacement and Maintenance

a. Whether operating the Project to maintain the summer Lake level has impaired the functioning of the wetlands and riparian habitats on the Reservation within the Project boundary, including impairments to:

1. total wetland acreage; and

2. camas, nodding onion, cow parsnip, water parsnip, wild celery, and water potato on the Reservation and nearby areas;

also including:

3. Whether human activities unrelated to the Project (such as diking and agriculture) have substantially reduced the total acreage of wetland and riparian habitats on the Reservation within the project boundary; and,

4. Whether the distribution, structure, function, and extent of over 2,500 acres of wetland, riparian, and open water habitats within the Reservation and the Project boundary have adapted to, and are in a healthy state of equilibrium with the summer Lake level, natural ecological processes, and natural and man-made disturbances.

Findings of Fact and Discussion on the Disputed Issues of Material Fact

This section of the Decision will provide, for each issue, an introduction, findings of fact, including both subsidiary and ultimate findings of fact, followed by a discussion explaining the reasoning used in deriving the ultimate findings of fact, which are framed in terms of the issues identified for hearing.[8] Although each issue and sub-issue is addressed separately, there will necessarily be some repetition of the findings and discussion, since many of the issues are closely inter-related, and all are related to a considerable degree. For example, the effects of the Project on wetlands

[8] The Findings of Fact may adopt verbatim (or close) certain of the parties' proposed supporting and ultimate findings of fact, without attribution, other than the extent to which the reasons for the findings may be addressed in the Discussion sections. The parties' proposed findings of fact that are inconsistent with or contrary to the Findings of Fact expressed in this Decision, are expressly not adopted.

affect the aquatic habitats in the Lake and St. Joe River, which, of course affect water quality parameters, fish populations, and aquatic vegetation. The Project's effects on erosion, boating activity, and the accessibility of the Tribe's cultural resources are also related to the other issues. The issues will be addressed in their designated numerical order.

Issue 2: Erosion

Issue 2(a): What is the proportionate contribution to shoreline erosion on the Reservation within the Project boundary from natural erosion processes, waves from motorized boats, and effects from Project operations to maintain the summer Lake levels.

Supporting Facts

1. Natural erosion processes, waves from motorized boats, and effects from Project operations to maintain the summer Lake level contribute to shoreline erosion on the Reservation. (Stipulation Between Avista Corporation and Bureau of Indian Affairs, filed November 24, 2006).

2. More erosion is caused by water waves generated by boats and wind than any other source. Lake level determines where boat and wind-generated waves will strike the shoreline. (Exs. A-8 at 2; A-25 at viii; A-26 at 2-6; B-1 at 10-11; Tr. 880).

3. In the absence of Project operations, wind, boats, and other factors[9] would all cause erosion on Reservation shoreline. (Ex. A-8 at 14-15; Tr. 849).

4. Over the next 30 to 50 years, erosion, if unchecked, along the lower 7 miles of the St. Joe River will consume roughly 39 to 65 acres; along the upper 17 miles of the St. Joe River, 28 to 47 acres; along the lower 4 miles of the Coeur d'Alene River, 9 to 14 acres; and along the lower 9 miles of the St. Maries River, 14 to 23 acres.[10] (Ex. A-12 at 5-46).

5. Erosion processes are complex and involve many interrelated factors. Assigning numeric percentages to the causes of erosion is difficult. (Exs. A-8 at 19; A-25 at ix; Tr. 860).

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[9] The term "other factors" is defined below in the discussion section of this issue.

[10] The Coeur d'Alene and St. Maries Rivers are not within Reservation boundaries.

6. There are approximately 16.2 miles of Coeur d'Alene Lake shoreline within the Reservation boundaries. (Ex. A-8 at 20).

7. During the summer recreation season, Project operations maintain Lake elevation between 2128 and 2125 feet for approximately 96% of the time. Under the natural hydrograph, the Lake would be within the 2128 to 2125-foot elevation for 10% of the summer recreation season. (Ex. B-1 at 15-16, Figure 3).

8. Lake shoreline ledges caused by erosion occur at 2126.5 feet and 2128 feet which correspond to current and historical Post Falls HED operating levels. (Ex. B-1 at 10-11).

– Boat-Generated Waves

9. Boat-generated waves are the single greatest source of man-made erosive energy acting on Reservation shoreline, with approximately 2 million ft-lb. per ft. of energy hitting the insides and ends of the levee banks during the June through August boating season. (Ex. A-8 at 14, 17).

10. Over a total period of 20 days, including holidays, weekends, and weekdays, 2,581 boats were counted moving through the St. Joe River. Sixty percent were speedboats, and 92% of all boats were traveling at speeds between 20 and 40 miles per hour. (Exs. A-8 at 14; A-25 at 5-14).

11. It is estimated that between 10,000 and 12,000 boat passages (5000 to 6000 round trips) occur on the lower St. Joe River between June 1 and the end of September each year. (Ex. A-25 at 5-15).

12. Project operations maintain the Lake at the 2128-foot level during the primary recreation season which is also the period of heaviest boating activity. (Ex. B-1 at 13).

13. Project operations increase the area available for boating, during the summer recreation season, on the Reservation, and therefore increases boat-generated wave erosion on Reservation shoreline. (See Ultimate Finding of Fact Issue 2(b); see also Ex. B-1 at 10).

– Vegetation

14. Many original, dense forest areas along river banks in the Project area were clear cut before Project operations began. (Ex. A-26 at 6-1).

15. Project operations maintain Lake elevation at the 2128-foot elevation for essentially the entire growing season. Inundation up to the 2128-foot elevation has caused the tree, brush, and grass line in the Lake and tributaries to move up to the 2128 level. This shift in vegetation leaves shoreline more vulnerable to erosive forces. (Exs. A-8 at 18, 22; A-26 at 1-4 Figure 1-2, 2-15; B-182 at 3-18; B-1 at 13, 20-21; Tr. 861-62).

16. In the absence of Project operations, the tree, brush, and grass line would move from the 2128-foot elevation down to somewhere between the 2122- and 2124-foot elevation. (Ex. A-8 at 34; Tr. 863-64).

17. The Project has altered much of the vegetation between the 2121 and 2128-foot elevations from wetland forest and scrub-shrub communities to aquatic bed communities. When those areas are drained after Lake drawdown in the fall, their vegetative cover is much sparser than those areas would be under the natural hydrograph. Much of that acreage can then be characterized as mud flats, which exposes them to greater erosion during winter and spring storms than those areas would experience with the denser vegetative cover that would exist under the natural hydrograph. (Ex. B-66 at 44; Tr. 703).

– Wind Fetch

18. Project operations increase the total surface area and depth of the Lake, causing increased wind fetch (wind-driven wave energy) and corresponding shoreline erosion. (Exs. A-8 at 21; A-25 at 5-12; B-1 at 24-25).

– Natural Erosion

19. Natural erosion processes include rain splash, rilling, freeze-thaw erosion from moist banks, piping, and slumping. These forms of erosion occur most frequently in the winter and/or during high flow periods. Due to the Project's creation of sparsely vegetated mud flats after drawdown, Project operations make

Reservation shoreline more susceptible to these erosion processes during winter and spring. (Ex. A-8 at 21, 26; Supporting Fact #17 above).

– Other Man-Made Causes of Erosion

20. Historical and current human activities contributing to shoreline erosion within the Reservation include development; agriculture; logging; ranching; the removal of woody debris for navigational purposes; and building dikes, bulkheads, and docks. (Ex. A-8 at 2).

Ultimate Finding of Fact

Project operations are responsible for about 50% of the erosion occurring on the St. Joe River and for about 30% of erosion on Reservation shoreline of Coeur d'Alene Lake.

Discussion

This issue relates to BIA's proposed Condition 2 which requires Avista to undertake erosion assessment and implement erosion control programs. In the justification section for Condition 2, BIA asserts that Project operations promote boating, increase wind wave action, and are the primary cause of erosion up to, and in some cases above, the 2128-foot elevation.

The parties agree on most of the salient issues related to erosion, including most of the factors causing erosion. Disagreement between the parties hinges on how those erosion factors interrelate and how much erosion is caused by Project operations.

Bruce Stoker is a licensed engineering geologist specializing in sediment transport who has been certified as a professional soil erosion and sediment control specialist by the International Erosion Control Association. (Ex. A-8 at 1-3). Mr. Stoker has studied Reservation shoreline erosion within the Project boundary using a number of techniques, including analyzing historical and aerial photos, installing erosion monitoring equipment, and surveying the banks and levees of the Lake and the St. Joe River. Mr. Stoker assisted in preparation of the 2004 Spokane River Hydroelectric Project Phase 2 Erosion Assessment (Ex. A-25) and drafted the 2006 Post Falls Hydroelectric Project Erosion Report (Ex. A-26).

Mr. Stoker has concluded that the causes of all Reservation shoreline erosion can be grouped into four separate categories: boat-generated waves, wind-generated waves, Project operations, and "other factors." In Mr. Stoker's opinion, most erosion on the Reservation within the Project boundary is caused by "other factors" which is broadly defined as all natural and man-made processes except Project operations, boat-generated waves, and wind-generated waves.

Within the "other factors" category are natural erosion processes, include freeze-thaw action, rilling, sheetwash, piping, and slumping. Man-made erosion components of the other factors category include development; agriculture; logging; ranching; the removal of woody debris for navigational purposes; and building dikes, bulkheads, and docks. (Ex. A-8 at 2).

Mr. Stoker's aggregated estimate of the proportionate causes of erosion along the Reservation within the project boundary is that 32% of erosion is caused by other factors, 26% is caused by boat waves, 21% is caused by wind- generated waves, and 21% is caused by Project operations. (Ex. A-8 at 2).

BIA's witness on erosion, James F. Reilly, a supervising engineer at Stetson Engineers, is a professional civil engineer who specializes in water resources, hydraulics, and hydrology. (Ex. B-1 at 6-7). In Mr. Reilly's opinion, Mr. Stoker's erosion estimates fail to fully account for the fact that Project operations, by changing the elevation, timing, and duration of Lake levels, have concentrated wave energy on a relatively narrow band of the Lake's shoreline. Mr. Reilly also believes that Mr. Stoker's allocation of proportionate responsibility to the four above-referenced causes of erosion is unreliable and not factually supported. Mr. Reilly argues that Mr. Stoker has failed to isolate the effects of each erosion mechanism or explain how each mechanism was individually analyzed. (Ex. B-1 at 10, 26-27).

In his direct testimony, Mr. Stoker estimated the proportion of erosion caused by each of the four factors along four separate physical locations including the Lake shoreline and three separate reaches of the St. Joe River. The chart below summarizes Mr Stoker's estimates.

	Percentage Contribution			
Location	Wind	Boat	Project	Other
Lake Shoreline	50	20	10 to 20	10 to 20
St Joe River: mile 0 to 3	20	20	30 to 50	10 to 30
St Joe River: mile 3 to 7	10	30	30 to 50	10 to 30
St Joe River: mile 7 to 17	"minor"	30	20 to 30	40 to 50

During the hearing, questions arose regarding exhibit A-28, a spreadsheet entitled "Estimate Composite Erosion," which reports some of the data underlying Mr. Stoker's erosion estimates. Exhibit A-28 breaks the three St. Joe River reaches identified above into seven sub-reaches. For example, the reach from miles 0 to 3 is divided into four separate sub-reaches of various lengths. Exhibit A-28 identifies the percentage of erosion caused by each of four factors (i.e., wind, boat, project, and other) for each of the seven sub-reaches using length-weighted averages. The concern with Exhibit A-28 at hearing was that the percentages reported for each erosion factor in the "Weighted Average Percent" column of exhibit A-28 do not equal 100% for each individual sub-reach.

This is because the "Weighted Average Percent" column reports percentages weighted by the length in feet of the sub-reaches to which it refers. To calculate the total contribution of an erosion factor within a river reach one must: (1) convert each weighted percent into a decimal figure, (2) multiply the decimal figure by the length in feet of the sub-reach to which it applies, (3) sum each of these figures for all of the sub-reaches within a given river reach, and (4) divide that figure by the total number of shoreline feet within the subject river reach. Computed this way, erosion factor percentages reported in exhibit A-28 do total 100% for each of the three St. Joe River reaches.

Nonetheless, with regard to exhibit A-28, Mr. Stoker testified

> * * * I emphasize that these are estimates. I told the work group these are rough estimates, and it is a way of ranking these processes out there based on my studies and you shouldn't hang your hat on whether it is 20

> percent or 15 percent. If its around 20 percent of time, that's about a quarter, if it is around 50 percent, 40 percent, you see it's a rough number. So you want to think in terms of, oh, yeah, the project influences about a quarter of it. The project influences about half of it. Natural erosion is a big factor and the prime factor, the majority. That kind of thinking is what you should do instead of clinging to the numbers.

(Tr. 859). Mr. Stoker also testified that the percentage designations are useful for ranking erosion factors in terms of which is the primary cause of erosion, which is the second largest factor contributing to erosion, etc., but that the percentages assigned to each factor are not definitive. (Tr. 860-62, 874).

Mr. Stoker's erosion estimates are based on data and research which is reported in the 2004 Spokane River Hydroelectric Project Phase 2 Erosion Assessment (Ex. A-25) and the 2006 Post Falls Hydroelectric Project Erosion Report (Ex. A-26). However, Mr. Stoker's estimates are admittedly rough and based, in part, on his professional judgment.

Mr. Stoker's conclusions are based on "the studies I have conducted over the past three years, including extensive field work as well as my experience, expertise, and professional judgment." (Ex. A-8 at 16-17). Because Mr. Stoker used his professional judgment in making his erosion estimates, those estimates are not entirely susceptible to scientific and mathematical testing. Put another way, Mr. Stoker's estimates cannot be readily tested the same way one could test whether a car actually gets the gas mileage its manufacturer claims. The number of interrelated factors and variables, as well as the time frame, which must be considered in analyzing erosion on Coeur d'Alene Lake and the lower reaches of the St. Joe River, render it extremely difficult to precisely assign proportionate responsibility for erosion on Reservation shoreline.

However, Mr. Stoker is a licensed engineering geologist with excellent credentials who specializes in sediment transport. He has gathered and recorded pertinent data on erosion on the Reservation and evaluated it to the best of his ability, resulting in the opinions discussed above. I found Mr. Stoker to be a credible witness who forthrightly acknowledged the limits of his estimates. He has more expertise, and did far more field work than Mr. Reilly. Accordingly, I accord considerable weight to Mr. Stoker's analysis.

However, I conclude that Project operations are responsible for somewhat more shoreline erosion on the Reservation within the Project boundary than Mr. Stoker estimates. There are two reasons for this conclusion. First, as discussed below, I have concluded that Project operations increase the level of boating within the boundaries of the Reservation. In his analysis, Mr. Stoker did not attribute any responsibility to Project operations for an increase in the level of boating within Reservation boundaries.

Mr. Stoker's analysis indicates that boat-generated waves are the greatest single source of man-made erosive energy acting on Reservation shoreline accounting for 26% of overall shoreline erosion. (Ex. A-8 at 17). In his direct testimony, Mr. Stoker stated "[b]oat waves as numerous and powerful as observed [in his study] would strike the Reservation shorelines and cause a great deal of erosion if the Lake were operated to the natural hydrograph." (Ex. A-8 at 15). However, under the natural hydrograph, as discussed below, there would be some reduction in recreational boating. Accordingly, there would also be some reduction in the number of boat-generated waves that would strike the Reservation shoreline. Therefore, some additional responsibility for boat-generated wave erosion must be attributed to Project operations.

Second, Mr. Stoker's analysis does not appear to adequately account for the fact that, under a natural hydrograph, the Lake level would not be held at the 2128-foot elevation for the entire summer recreation season. Mr. Stoker attributes additional erosion responsibility to Project operations for rendering shoreline more vulnerable to various erosive forces and for increasing wind fetch and its attendant erosive action. With regard to shifting the vegetation line to the 2128-foot elevation, Mr. Stoker stated in his direct testimony:

> To the extent that erosion from non-Project factors such as boat waves, wind waves, freeze-thaw processes, and other non-Project factors has increased from what would otherwise occur under a natural hydrograph, I have attributed such erosion to Project operations. For example, erosion from boat waves is increased in the lower reach of the St. Joe River because the loss of vegetation caused by Project operations makes the smaller and lower levees in this area more vulnerable to erosive forces of boat waves. (Ex. A-8 at 21).

Mr. Stoker acknowledges that Project operations determine the elevation at which erosive energy impacts Reservation shoreline and that Project operations have rendered that shoreline more vulnerable to erosion. (Ex. A-8 at 21; Tr. 878, 880).

However, Mr. Stoker's testimony, reports, and analysis do not appear to adequately address what Mr. Reilly calls the "laser effect."

At the heart of Mr. Reilly's testimony is the concept that Project operations are responsible for more erosion than Mr. Stoker estimates because Project operations hold the Lake within a few feet of the 2128 elevation for the entire summer recreation season. Project operations maintain Lake elevation between 2128 and 2125 feet for approximately 96% of the summer recreation season. Under the natural hydrograph, the Lake would be in that same range for only 10% of the summer recreation season. Mr. Reilly argues that, under the natural hydrograph, the gradual recession of the Lake would more evenly distribute erosive wave energy on a band of shoreline 7 feet wide, ultimately resulting in less total erosion because erosive energy would be diffused over a larger area.

Avista argues that Mr. Reilly's laser effect argument is mistaken because, under a natural hydrograph, Lake elevation would be between 2,122 and 2,120 feet for the busiest part of the boating season. Mr. Stoker made the same point at hearing. (Tr. 863). While this is correct to some degree, a cursory review of the graphs comparing the Lake level fluctuations over the course of the year (Ex. A-12 at 3-30, attached as Appendix A), demonstrates that Mr. Reilly's laser effect characterization of Lake levels is more accurate than Avista's. Under Project operations, the Lake level barely fluctuates from the 2128-foot elevation between late May and mid-September. Conversely, under the natural hydrograph, Lake level would gradually recede all summer long, is some years settling near the 2121 level by late summer. Under the natural hydrograph, shoreline erosion effects would be distributed throughout the 2121 to 2128-foot levels.

Mr. Stoker has done a thorough job of describing how existing erosion is occurring on the Reservation. However, in projecting erosion under a natural hydrograph, Mr. Stoker does not appear to have adequately considered the potential for reduced levels of erosion resulting from the absence of the laser effect caused by the Project's maintaining the Lake level throughout the boating season. It is not entirely clear in the record whether Mr. Stoker sufficiently considered the absence of this laser effect under the natural hydrograph. This stands in contrast to the detailed analysis and explanation Mr. Stoker provides for other aspects of erosion on the Lake. Mr. Stoker's erosion estimates did not fully take into consideration the fact that, under a natural hydrograph, Lake levels would not focus wave energy at or near the 2128-foot elevation for the entire summer recreation season.

Therefore, and because Project operations increase recreational boating within Reservation boundaries, it is appropriate to adjust Mr. Stoker's erosion estimates for Project operations slightly upward. Accordingly, I conclude that Project operations are responsible for about 50% of the erosion occurring on the St. Joe River and for about 30% of erosion on Reservation shoreline on Coeur d'Alene Lake.

Issue 2(b): Whether operating the Project to maintain the summer Lake level causes the amount of boating activity on Coeur d'Alene Lake and its tributaries within the Reservation and the Project boundary to increase.

Supporting Facts

1. Between March of 2003 and February 2004, over one million people visited Coeur d'Alene Lake. Boating and other water-related activities are the principal types of recreation pursued by these visitors. Approximately 69% of recreation on the Lake occurs during the "primary recreation season," Memorial Day through Labor Day. In the southern portion of the Lake, 82% of recreation use occurs during the primary recreation season. (Exs. A-50 at 21; A-51 at 7-8).

2. During the primary recreation season, Avista maintains the summer Lake level at an elevation of 2128 feet to accommodate recreation interests. (Exs. A-12 at 3-10; A-51 at 4, Figure 1, 7; B-89 at 1-2).

3. Approximately 74% of recreational boating occurs in the northen and middle reaches of Coeur d'Alene Lake, including the Spokane River upstream of the Post Falls HED. Approximately 26% of recreational boating occurs in the southern reaches of the Lake, including the Coeur d'Alene River, St. Joe River, and St. Maries River. (Ex. A-51 at 12, Table 6)

4. Lake capacity for recreational boating can be measured as peak use or average peak use. Peak use is the actual maximum use on a given day, typically the busiest recreation day of the year. Average peak use is the average use on weekends between Memorial Day and Labor Day, i.e., the primary recreation season. Under Project operations, peak use on Coeur d'Alene Lake reaches roughly 56% of total capacity. Average peak use under Project operations is approximately 23% of capacity. (Exs. A-51 at 2; B-2 at 5; B-157 at 17).

5. Under the natural hydrograph, during low water conditions, the Lake's surface area is 4316 acres smaller than it is under Project operations during the primary

recreation season. With a 4316-acre surface area reduction during peak use, boating use on the Lake would reach about 65% of total capacity. (Exs. A-51 at 4, Figure 1; B-2 at 5; Ex. B-157 at 17; Tr. 822).

6. Trend data from the Coeur d'Alene Lake area on boat ownership and boat registration indicates an increasing interest in recreational boating. Boat registration in the northern Idaho counties near the Lake has increased by approximately 9% since 2001. Shoreline property owners around Coeur d'Alene Lake report boat ownership at rates 3 times higher than 20 years ago and 9 times higher than 40 years ago. (Exs. A-51 at 11, 13; A-50 at 9-2).

7. Peak use capacity on Coeur d'Alene Lake could be reached in roughly 60 years under Project operations or 40 years under the natural hydrograph. Average peak use capacity on the Lake could be reached in approximately 150 years under Project operations or 125 years under the natural hydrograph. (Exs. A-51 at 2, 12-13; B-2 at 6; Tr. 823-24).

8. Boat access to the entire Lake (including the Coeur d'Alene River, St. Joe River, St. Maries River, lateral lakes,[11] the Reservation, and Heyburn State Park), is provided by 37 public boat ramps with 54 lanes, plus 12 commercial boat ramps with 21 lanes. There are also 1672 marina boat slips on the Lake. Specifically, on the Reservation, there are 10 public ramps with 13 lanes, 3 commercial ramps with 4 lanes, and 297 marina boat slips. (Ex. A-51 at 6, Table 2).

9. Under Project operations, and during the primary recreation season, boat access is available at all of the existing public access locations on the Lake and its tributaries. (Ex. A-51 at 9).

10. Many typical recreation vessels used on Coeur d'Alene Lake require water that is at least 2.5 feet deep to safely navigate. For purposes of this Decision, ramps submerged in less than 2.5 feet of water are considered inoperative. (Ex. B-2 at 9-10).

11. During most of the primary recreation season, Project operations increase lake surface area within the Reservation boundaries by 1807 acres of water that is at

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[11] These figures include boat access sites in the following lateral lakes: Chatcolet, Round, Benewah, Anderson, Black, Cave, Medicine, Killarney, and Rose.

least 4 feet deep, thereby allowing greater boat access to the lateral lakes. (Exs. A-25 at 5-14; A-50 at 4, Figure 1; B-1 at Figure 6).

12. Under a natural hydrograph, at least 7 boat ramps located within Reservation boundaries, or providing access to Tribal waters, would cease to provide access to the Lake. Theoretically, some of these ramps could be modified to provide access to the Lake with construction and/or dredging. However, permit requirements may prevent some ramps from being modified. In some areas (particularly the Coeur d'Alene River), the presence of sediments contaminated with toxic levels of metals contamination may pose an obstacle to dredging. (Exs. A-51 at 10-11; B-2 at 11-15; Tr. 838, 884-89).

13. Traveling from the Coeur d'Alene River to the northern part of the Lake requires a short transit through Reservation waters. South of the Coeur d'Alene River, the entire Lake and adjacent lateral lakes, as well as the lower St. Joe River, are within the Reservation boundary, except for Heyburn State Park. (Ex. A-57 at Figure 1-1; Tr. 828-29).

14. At the 2122 foot elevation (the natural hydrograph from roughly the first week in July through the remainder of the primary recreation season), at least 13 of the 37 publicly owned boat ramps would not provide access to Coeur d'Alene Lake. In the northern reaches of the Lake, and on the Spokane River upstream of the Post Falls HED, these include Q'emilin Park (CDA-02), Greensferry Launch (CDA-04), Blackwell Island (CDA-09), Mica Bay Access (CDA-71), and Kidd Island Bay (CDA-73). In the southern reaches of the Lake, including the lateral lakes, Coeur d'Alene River, St. Joe River, and St. Maries River, ramps which would not provide access at the 2122 foot elevation include the Killarney Lake Launch (CDA-46), Coeur d'Alene Informal Launch (CDA-75),[12] Harrison Docks/Launch (CDA-34), Chatcolet Use Area (CDA-61), Rocky Point (CDA-57), Benewah Use Area (CDA-56), St. Maries River Launch (CDA-55), and Shadowy St. Joe Campground (CDA-76). (Exs. A-51 at 10; B-2 at 11-15; Tr. 809).

15. Some of the above-referenced ramps could be extended to provide access to the Lake. However, at least five would also require dredging at some point between the ramp and main Lake to provide access at the 2122 foot elevation. These ramps include

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[12] The Coeur d'Alene Informal Launch (CDA-75), has adequate depth at the end of the ramp, but 2 miles downstream on the Coeur d'Alene River, between the Launch and Coeur d'Alene Lake the depth of the river bed climbs to 2120 feet across the entire channel.

the Coeur d'Alene Informal Launch (CDA-75), Killarney Lake Launch (CDA-46), Chatcolet Use Area (CDA-61), Rocky Point (CDA-57), and Benewah Use Area (CDA-56). (Exs. B-1 at Figure 6; B-2 at 11-14; B-89 at 2-20, Figure 2-15; Tr. 820-23).

16. Heavy metals contamination is of particular concern with regard to dredging the inlet between Killarney Lake and the Coeur d'Alene River. (Tr. 884-85).

17. Round, Chatcolet, and Benewah Lakes physically connect to Coeur d'Alene Lake at the 2128 foot elevation. Channels, including Heyburn Channel (Kerr Channel), have been dredged to provide boat access between these lateral Lakes and the main body of the Lake. (Exs. A-26 at 2-20, Figures 2-15, 2-29, 2-31-32; B-1 at Figure 7; Tr. 820-23).

18. Under the natural hydrograph, additional dredging would be necessary at Heyburn Channel to connect Chatcolet Use Area (CDA-61), Rocky Point (CDA-57), and Benewah Use Area (CDA-56), with Coeur d'Alene Lake and the St. Joe River. Under the natural hydrograph, and without dredging, Heyburn Channel would not be navigable during most of the primary recreation season. (Exs. B-2 at 13; B-89 at 2-20, Figure 2-15; Tr. 820-23, 884-85).

19. The Chatcolet day-use facility (CDA-61), within Heyburn State Park, is a relatively large and well-used Lake access site with parking to accommodate roughly 155 vehicles. (Ex. A-50 at 256; Tr. 815, 886).

Ultimate Finding of Fact

Operating the Project to maintain the summer Lake level extends the boating season on Coeur d'Alene Lake and its tributaries on the Reservation within the Project boundary and enables boating in some areas that otherwise would not be accessible. The Reservation, in particular, has a large proportion of recreation areas affected by Project operations. In these areas, boating activity is increased because of the higher Lake level maintained by the Project.

Discussion

During this proceeding, the parties discussed boating on the Lake under two separate theoretical scenarios to describe how, or whether, Project operations affect boating activity. Under one scenario, the Post Falls HED would not have been built and

the Lake would function naturally. Under the other scenario, Project operations would begin to maintain the Lake at the natural hydrograph.

Under the first scenario, boat ramps and channels would have been built differently or, perhaps in some cases, not built at all. Under the second scenario, many existing ramps and channels would have to modified, abandoned, or entirely reconstructed. Both scenarios are useful for discussing and evaluating whether Project operations increase boating on the Reservation. However, consideration under either scenario leads to the same result on issue 2(b).

Dr. Benjamin Ellis is a Senior Planner and Environmental Consultant with the Louis Berger Group. Mr. Ellis prepared, or assisted in the preparation of, two reports analyzing recreation on Coeur d'Alene Lake. Those reports are the 2004 Recreation Facility Inventory and User Surveys Report (Ex. A-50) and the 2006 Final Recreation Summary Report (Ex. A-51). Mr. Ellis' conclusion is that Project operations do not increase the level of boating on Coeur d'Alene Lake. This conclusion is based, in part, on the following three assertions: (1) boating use levels on the Lake reflect seasonal and regional demand rather than a preference for a particular Lake elevation; (2) current boating use on the Lake is below capacity and will continue to grow irrespective of Project operations; and (3), only limited boating occurs in shallow waters near the mouth of the St. Joe River. (Ex. A-7 at 2).

Avista argues that boat ramps that do not provide access to the Lake under the natural hydrograph would be modified to provide access and that dredging could reconnect lateral lakes and tributaries that become disconnected from Coeur d'Alene Lake.[13] Perhaps more importantly, Avista argues that boat use would shift from ramps that become inoperative under the natural hydrograph to ramps that remain operative, and that these operative ramps would be developed to meet user demand.

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[13] Avista argues that the Killarney Lake Launch should be disregarded for purposes of this Decision because it is too far from Tribal waters to be relevant and not heavily used. This argument cannot be sustained because boat ramps that connect to the Coeur d'Alene River provide access to the entire Lake, including Tribal waters. Avista argues that ramp use would shift under a natural hydrograph but has not analyzed how use would be redistributed. Understanding which ramps may not provide access to Tribal waters under a natural hydrograph is relevant for purposes of this Decision. Avista cites exhibit A-50 at App. C, Table C-1, as support for the assertion that the Killarney Lake Launch is not heavily used. That table reports non-motorized boat use; hence it is unclear how Avista has concluded that the Killarney Lake Launch receives low use. Exhibit A-50 at App. C, Table C.3.2, suggests that overall use at the Killarney Lake Launch is average or above average for recreation sites around the Lake.

In its post-hearing reply brief, Avista argues that ramps within Heyburn State Park should be excluded from consideration in this Decision. Regardless of the ownership status of the submerged lands in Heyburn State Park, boat ramps in that park provide access to the entire Lake, including Reservation waters. Therefore, it is appropriate to consider the effects of Project operations on boat ramps and boat access in Heyburn State Park.

Jason Brown is the Tribe's Navigable Waters Specialist and has been employed by the Tribe for five years. Mr. Brown is responsible for implementing Lake encroachment standards and guidelines under the Tribe's Law and Order Code. Mr. Brown analyzed Avista's recreation reports and data and concluded that Project operations facilitate boating within Reservation boundaries due to the Project's creation of larger areas, accessible for longer periods of time, than would exist under the natural hydrograph. (Ex. B-2 at 2). Mr. Brown also testified that modification of some boat ramps may not be possible due to contamination and permitting issues. (Tr. 884-88).

With regard to the overall, long-term picture, Avista is probably correct that, if the Project operated at the natural hydrograph, the recreational boating infrastructure would be modified and adjusted to meet the regional demand. Little, if any, overall reduction in recreational boating would be likely to occur under the natural hydrograph, at least over the long term.

However, Avista's analysis focuses on overall recreational boating on Coeur d'Alene Lake and does not fully account for how changes under the natural hydrograph would affect boating within the Reservation's boundaries and the adjacent waters. Currently, about 25% of all boating in the Lake occurs in the southern portion of Coeur d'Alene Lake and its tributaries. That 25% of total boating is 100% of all boating occurring within the Reservation boundaries or adjacent waters. If, for example, just 7% of total recreational boating shifted from the southern portion of Coeur d'Alene Lake, including its tributaries and lateral lakes, to the Lake's northern reaches, boating within the Reservation's boundaries and adjacent waters would be reduced by over 25%. Thus, a subtle difference, or shift, in lake-wide boating distribution would result in a significant difference for the Reservation.

Under the natural hydrograph, 1807 acres of water at least 4 feet deep within the Reservation boundaries would no longer be available for boating during most of the primary recreation season. While some of these waters may not be ideal for recreational boating, some certainly provide expanded recreational boating opportunities. Without

dredging, which may or may not be feasible, direct access to Chatcolet Lake and Benewah Lake would be cut off for most of the primary recreation season. Accordingly, three boat ramps in these lakes, including the popular Chatcolet Use Area (CDA-61), would not provide access to Coeur d'Alene Lake during that period.

Without modification and, in some cases, dredging, a total of seven boat ramps which provide access to Coeur d'Alene Lake waters in and around the Reservation would cease to provide access during most of the primary recreation season. Some of these ramps would, in all likelihood, eventually be reconnected to the Lake. However, Avista's analysis did not evaluate the costs of modifying existing ramps and shifting use to other ramps, or the time needed to do so. Because of permitting requirements, economic feasibility, and issues related to dredging contaminated sediments, some of the seven ramps would probably not be reconnected to the Lake.

In its PDEA, Avista describes how current recreation on the Lake would be affected by maintaining the natural hydrograph as follows:

> In contrast to the current condition, Coeur d'Alene Lake would drop relatively quickly following the end of the spring freshet and would fall to its historical low levels during summer and fall. With the lower summer lake levels, fewer public access sites would provide access to Coeur d'Alene Lake and the Coeur d'Alene and St. Joe rivers because the boat ramps and docks currently located in shallow water would no longer reach the water. * * * Many of the existing sites around the lake and on the rivers would require significant modification to remain useful, such as extending the boat ramps and developing new docks and mooring systems. Others would no longer provide access during the summer recreation season, particularly those in upstream areas that are currently shallow and provide only marginal public access when the lake is low. (Ex. A-12 at 3-36).

For these reasons, I conclude that Project operations facilitate boating within the boundaries of the Reservation and its adjacent waters and that at least some boating within the boundaries of the Reservation would not occur in the absence of Project operations. The record does not provide an adequate basis to precisely quantify this increase in boating activity that can be attributed to Project operations. The record does support Avista's contention that recreational boating would still remain popular and substantial under the natural hydrograph. Thus, the increase attributed to maintaining

the summer Lake level can be characterized as incremental due to increased accessibility in the southern end of the Lake. If I had to speculate, the increase attributed to the Project in Reservation waters might be on the order of about 10%.

Issue 3. Water Resources

(a). Whether operating the Project to maintain the summer Lake level creates conditions in the Lake that affect plant growth and distribution, including effects related to: (1) Temperature; and (2) Dissolved Oxygen.

Supporting Facts

The Supporting Facts concerning this issue are divided into two sections. The first addresses the computer modeling of the Lake conducted by Avista's consultants, upon which Avista primarily relies. The second addresses the more directly observable qualitative facts surrounding plant growth, temperature, and dissolved oxygen in the Lake and Reservation area, upon which BIA and the Tribe primarily rely. To a large extent, these supporting facts will also be relevant and incorporated into the portions of the Decision below addressing the issues of eutrophication, metals, aquatic weeds, fisheries, and wetlands.

– Computer Modeling of the Lake

1. In order to determine the effects of Project operation on plant growth and distribution, and on related water quality parameters in the Lake, Avista's consultant, Golder Associates ("Golder"), undertook a computer modeling effort to compare the effects of current Project operations with those of operating under the natural hydrograph. For this purpose, Avista employed the CE-QUAL-W2 model ("W2 Model" or "Model"), a computer simulation tool originally developed by the U.S. Army Corps of Engineers in 1986. The W2 model is widely used by government and tribal agencies, including agencies of the U.S. Department of the Interior, in making water quality decisions concerning water bodies such as lakes, reservoirs, rivers, and river basins. During the Alternative Licensing Process in Avista's FERC application for the Project, the W2 Model was chosen by the Water Resources Work Group, which included the Tribe and Idaho DEQ, to simulate Lake conditions to assess the Project's effects on water quality. Golder's modeling work was reviewed by Dr. Scott Wells, one of the W2 Model's developers, and a witness for Avista at the hearing. (Exs. A-1 at 7-8, B-3 at 15, A-34 at 1).

2. The W2 Model is most suitable for relatively long, narrow water bodies, such as rivers and Coeur d'Alene Lake. It has also been used for the Spokane River and reservoirs downstream in the Spokane River Project. The Model is two-dimensional. It averages the hydrodynamics, temperature, and water quality parameters in the lateral direction, but simulates the vertical and longitudinal variability of these properties. Golder used Version 3.1 of the CE-QUAL-W2 Model, which was the latest version available at the time of its simulation in 2005. The chief parameters sought to be modeled were water temperature, dissolved oxygen ("DO"), nutrients, aquatic plants, and pH. (Ex A-34 at 4-5).

3. The modelers performed the following sequence of steps, in accord with the W2 manual: Model set-up; calibration and validation; prediction of effects of current Project operation; sensitivity analysis; and simulation of effects of operating in accord with the natural hydrograph. Set-up involved establishing the Model domain, computational grid, boundary conditions, initial conditions, and inputting forcing conditions and process parameters. Golder divided the Lake into four main management zones, including all shallow areas inundated by maintaining the summer Lake level. One of those zones was the "Shallow South," encompassing the Reservation and Heyburn State Park areas, including the lower reaches of the St. Joe and St. Maries River, and the lateral lakes. The modelers input the most recent bathymetric data to establish the computational grid. Boundary conditions from external sources or sinks were obtained from observed data, including that for Lake outflow, inflow from tributaries, and water quality parameters of the inflow. (Exs. A-1 at 9-10; A-34 at 7-9).

4. Golder used data mostly from 1991 and 1992 to input initial conditions for the modeled constituents. However, the organic matter related parameters were based on data obtained from 1971 to 1976. The data from 1991 and 1992 represented one relatively wet and one dry year, for which reasonably complete sets of data were available. The modelers then input forcing data, primarily consisting of detailed meteorological records obtained from Spokane and Coeur d'Alene airports. Golder then conducted a simulation of the effects of the Project's current operation for the 10-year period following the initial conditions, 1992 to 2001. (Ex. A-34 at 10-11, 14).

5. The modelers then conducted the next key step: calibration of the Model. This is designed to compare and adjust the model's simulation results with actual observed data in order to gauge the model's ability to predict the effects of the Project on the various water quality parameters. Golder followed a detailed protocol as prescribed by the W2 Model developers, including Dr. Wells. "The calibration consisted of a

systematic procedure of adjusting various process parameters that control water balance and hydrodynamics, vertical and horizontal mixing, surface and bottom heat exchanges, and water quality constituents within the water column." * * * "The parameter values were systematically adjusted to maximize the agreement between water temperatures and water quality constituents at 10 calibration locations. Due to inter-relationships among various temperature, water quality constituents and internal water body processes, the calibration consisted of a systematic trial-and-error procedure of adjusting various process parameters. These process parameters control water temperature, nutrients, phytoplankton, DO, and pH." (Ex. A-34 at 12).

6. The calibration showed two main areas that required significant adjustment in order to maximize agreement between predicted and observed data. In order to achieve such agreement on water temperature, major adjustments were required to wind shelter coefficients, which affect evaporation, mixing, aeration, and heat exchange between the surface of the Lake and the atmosphere. (Ex. A-34 at 12-13).

7. The other main adjustment was required in the calibration for aquatic plants. The W2 Model version used at the time of Avista's simulation did not have a module to input data for macrophytes, or visible aquatic plants. The modelers used the module for epiphytes (aquatic plants that attach to other plants) as a surrogate for macrophytes. Golder set the growth rate at 5 times the default value for epiphytes, to accord with the reported value for average biomass in temperate lakes. A subsequent version of the W2 Model with a macrophyte module has since become available, but Avista has not run a simulation of Coeur d'Alene Lake parameters with that module. (Ex. A-34 at 12-13; Tr. 1109).

8. The calibration results generally showed acceptable agreement between predicted and observed results for most water quality parameters. The overall absolute mean difference ("AMD") between those results for temperature in the Lake was 0.99°C, barely within the 1.0°C criterion recommended for calibration of the W2 Model. Temperature results did accurately correlate with observed data in predicting thermal stratification and temporal variability at all calibration locations. The overall accuracy of the DO calibration was 0.7 mg/L, within the recommended range of 1.0 mg/L. The calibration results for pH also closely tracked observed data. (Exs. A-1 at 17-18; A-34, B-101 at 16-18).

9. The Model calibration results for nutrients and phytoplankton were not as successful as those for temperature, DO, and pH. This may have been due to the lack of

a macrophyte module for the W2 Model, and the limited available data for plant biomass and nutrient loading. Available data indicates that the major source of nutrients in the southern part of the Lake is inflow from the St. Joe River. (Exs. A-34 at 18; B-67 at 31-32; B-259 at 92).

10. After calibration, Golder conducted a simulation of current conditions for a 10-year period, 1992 to 2001. This provided additional confirmation of the correlation between simulated conditions and observed data for temperature, DO, and nutrients in the Lake. Golder then performed a sensitivity analysis to identify factors that have the greatest influence on predictions of water quality parameters. By manipulating various input settings, the magnitude of the effects on the predictions could be assessed. The sensitivity analysis did not change the overall Model results. (Ex. A-30 at 3, A-34 at 24; Tr. 65).

11. Golder then ran a simulation on the W2 Model of operation of the Project at the natural hydrograph, for comparison with the modeling results and observed data on current Project operation maintaining the summer Lake level. Overall, the modeling results showed little or no effect on temperature and other water quality parameters from the Project during the December to May period, when the HED does not impound Lake waters. In summer, the Model showed a "slight" temperature increase in the upper and middle layers of the deep Lake segments, but a "low to negligible" increase, in the bottom layers. Warmer temperatures under Project operation were more pronounced in the shallow areas of the Lake than in deep water segments. (Ex. A-34 at 28-29).

12. "[T]he modeling results indicate that the HED has resulted in higher water temperatures in the shallow areas of the southern portion of the Lake during June to November compared to what might occur under unimpounded conditions." The greatest warming effect was predicted at Benewah Lake, where water temperatures were indicated to be as much as 2.4°C higher for up to 15 days during August and September than under the natural hydrograph condition. (Ex. A-34 at 38).

13. The Model results also indicated that operation of Post Falls HED slightly reduces DO in the Lake compared to unimpounded or natural hydrograph conditions. This effect was also most pronounced in the southern portion of the Lake, where DO in Benewah Lake is as much as 0.6 mg/L less under Project operation than under the natural hydrograph. For the bottom of Chatcolet Lake, the model showed that maintaining the summer Lake level extends the summer period of anoxia by an average

of 10 days per year, up to a maximum of 19 additional days. Anoxic conditions would normally develop in Chatcolet Lake in the summer under the natural hydrograph, but would not last as long. (Ex. 34 at 28-29, 38).

14. The Model results for temperature indicated that an effect of the Project is to increase the volume of water in the shallow segments of the Lake that is not in compliance with the IDEQ cold water standard during August (19°C) by about 16%. Similarly, the Project increases the shallow water volume below the IDEQ DO standard (6 mg/L) during August by about 22%, and during July by 16%. The modeling also showed that operation of Post Falls HED, on the other hand, increases the volume of water in compliance with these standards in the deeper waters of the Lake. (Ex. A-34 at 39-40).

15. The Model results did not show any increase in non-compliance with pH or nitrogen-ammonia standards due to the Project. At Benewah Lake, a 10% increase in the frequency of non-compliance with EPA's guidance for total phosphorus was indicated. Modeling of phytoplankton and aquatic plants was inconclusive, with some years showing an increase in biomass under Project operations, and others resulting in the opposite effect, or increased biomass under the natural hydrogaph. (Ex. A-34 at 39).

16. The CE-QUAL-W2 Model, like any computer model designed to simulate real world environmental conditions, has certain limitations. Due to the great complexity of water quality processes and the interactions of a multitude of factors, any model prediction can only be an approximation of actual conditions. The modelers at Golder intended that the results here be interpreted as representative of water quality conditions in the Lake based on the aggregate statistics, rather than on individual spikes or anomalies in the output. The model is not intended to be used to forecast absolute water quality conditions. By modeling the entire Lake, the W2 modeling effort was not specifically directed toward predicting the effects of the more complex processes that occur in the shallow southern portions of the Lake that are more likely to be affected by Project operations. (Ex. A-34 at 41-42; Tr. 108).

17. Some of the chief limitations of the W2 Model in its simulation of Coeur d'Alene Lake and the Reservation area in the southern end can be specifically identified. The Model used by Golder did not have a macrophyte module, which rendered the results on aquatic plants relatively uncertain. The epiphytes used in the W2 Model as a surrogate compete with phytoplankton to recycle nutrients within the water column, while macrophytes cycle nutrients from the lake bed sediments into the

water column. Another Army Corps of Engineers model for Eurasion water milfoil was available and could have been used to provide input data for milfoil into the W2 modeling effort. (Ex. B-4 at 14; Tr. 425-426).

18. Other uncertainties in the W2 modeling effort conducted by Golder include the following: lateral averaging of parameters may be unrepresentative of varying conditions across the St. Joe River and lateral lakes area; use of organic loading data from 1971-1976 may be outdated and unreliable; and extensive adjusting of wind shelter coefficients was required for calibration. Overall, however, the W2 modeling endeavor fulfilled its purpose of providing the work group with a broad picture of the effects of Post Falls HED's operations maintaining the summer Lake level. (Exs. A-1 at 16-18; B-4 at 15-20).

– Observable Effects of Project on Plant Growth and Distribution

19. Operation of Post Falls HED to maintain the summer Lake level increases the area of shallow water habitat in the Lake, and the length of time such habitat persists, substantially over what would occur under the natural hydrograph. Over the entire Lake, 8965 acres remain inundated in late summer under Project operation that would be drained at that time under the natural hydrograph. This corresponds to the area between elevations 2120 and 2128 feet. About 40% of this inundated area, 3905 acres, is in the lateral lakes along the lower Coeur d'Alene and St. Joe Rivers. Another 3160 acres in the main Lake and 3045 acres in the lateral lakes, between elevations 2112 and 2120, remain as shallow water areas under Project operation, suitable for the growth of aquatic plants. Within the Reservation area, the Tribe estimates that 4040 acres are inundated in the late summer that would be drained under the natural hydrograph. (Exs. A-12 at 3-28; A-33 at 35; B-66 at 4).

20. The operation of the Project has thus extended the period of inundation of some 4000 acres of shallow water areas on the Reservation throughout the summer. Shallow water warms faster than deeper water. Hence those areas, particularly the lateral lakes along the St. Joe River, experience warmer temperatures in late summer, as confirmed by the Model. Warmer water cannot accommodate as much DO as cold water. Hence, as also shown by the Model, DO concentrations are lower, and the period of anoxia in the lateral lakes is extended in those areas. (Ex. B-3 at 16-17).

21. As further described in relation to the wetland issues (Issue 7[a]), emergent vegetation, which usually reaches the water surface, grows at depths less than 2 meters,

or 6.6 feet. Aquatic bed, or submergent, vegetation grows at depths exceeding 2 meters. Along the St. Joe River, the Project has transformed extensive areas of forested, scrub-shrub, and emergent habitat to aquatic bed and open water habitat. For example, Avista's consultant Parametrix mapped a reduction in emergent habitat on the St. Joe River within the Reservation and Project boundary, from 942 acres in 1908 to only 100 remaining in 2003. During that period, deep water and aquatic bed wetlands increased from 73 to 1096 acres in that same area.[14] Large areas of higher elevation forested and scrub-shrub habitat along the St. Joe River levees were also lost to erosion and converted to aquatic bed habitat. Similar shifts in habitat due to the inundation caused by the Project have occurred at the heads of bays in other parts of the Lake. (Exs. A-55 at 3-22--3-23, 3-39--3-40; A-57 at 7-2--7-5).

22. Another example of the effect of inundation by the Project is seen in Round Lake, the largest lateral lake along the St. Joe on the Reservation. Under the natural hydrograph, most of Round Lake would only be inundated for a short time in the spring. It would then support a combination of forested, shrub-scrub, and emergent wetland habitats. Under current Post Falls HED operations, Round Lake remains almost entirely aquatic bed habitat throughout the summer, until fall drawdown. The deeper Chatcolet Lake, in Heyburn State Park, would be about half aquatic bed habitat under the natural hydrograph. Due to the Project's maintaining the Lake level, it is now almost entirely open water. (Ex. B-66 at 51).

23. The inundation effect of the Project's operation alone, apart from additional effects on temperature and dissolved oxygen, has affected plant growth and distribution in the Lake and on the Reservation within the Project boundary. Maintaining the summer Lake level has shifted aquatic and terrestrial wetland habitats to increase aquatic bed and open water, while decreasing emergent, forested, and scrub-shrub, as further addressed below in relation to the wetlands issues. Holding the Lake at the 2128 level during virtually the entire growing season saturates the soil and prevents the re-establishment of scrub-shrub and forested habitats in areas between 2120 and 2128 feet in elevation. Emergent vegetation is limited to only the upper two feet or so, at about 2126 feet and above. The Project has greatly expanded the areas with depths of 6 to 18 feet, creating additional habitat for submergent aquatic plants. One of those submergent plants is Eurasian water milfoil, an exotic noxious weed, further discussed below in relation to Issue 6. The effects of the Project on wetlands will be

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[14] These figures do not include Hepton Lake, for the reasons discussed in relation to Issue 7 concerning wetlands.

discussed in greater detail in relation to Issue 7. (Exs. A-12 at 188, 191; B-39 at 5-196; B-66 at 48-52).

24. As shown in the CE-QUAL-W2 Model results, the Project's maintenance of the summer Lake level also causes an increase in summer water temperatures and a decrease in DO in shallow waters in the southern end of the Lake, particularly the lateral lakes along the St. Joe River. Warmer water temperatures also promote the growth of certain aquatic plants, including Eurasian watermilfoil. Colder water has a greater capacity for dissolved oxygen; hence warmer water temperatures lead to decreased DO. In addition, to the extent these conditions promote the growth of aquatic plants, the potential for nutrient loading, or eutrophication, is increased as those plants die and decompose. Eutrophication will be further discussed in relation to Issue 3(b) below. (Ex. B-3 at 19).

25. Coeur d'Alene Lake as a whole is currently considered oligotrophic, or relatively low in production of nutrients and high in dissolved oxygen, with relatively clear water. Earlier in the 20th century, the Lake received heavy loads of nutrients and oxygen-demanding substances as a result of extensive mining, logging, sewage discharge, and unregulated development around the Lake. In 1975 the Lake was considered mesotrophic, or characterized by higher nutrient production, lower DO, and higher turbidity. In the 1970's and 80', wastewater treatment plants were constructed in the watershed, and better management practices were implemented in logging and mining waste disposal. These improvements greatly reduced nutrient loads entering the Lake, enabling it to shift from mesotrophy to oligotrophy by the 1990's. However, the southern end of the Lake, due its shallow depths and high nutrient loading from the St. Joe River, both historically and currently trend closer to mesotrophic conditions. (Exs. B-259 at 116; Tr. 269-270).

26. Although land management practices have generally improved over the past decades, commercial and residential development is growing rapidly around Coeur d'Alene Lake and in its watershed. The population of Kootenai County has almost doubled from 1980 to 2003, when it was estimated at over 117,000. Land development increases nutrient loading in the Lake by increasing erosion and runoff, and by increasing the potential of seepage from septic tanks. Similar effects result from associated activities such as road building, as well as continuing logging and agriculture in the basin. (Exs. A-12 at 5-267, B-259 at 13).

27. The main body of Coeur d'Alene Lake typically stratifies in the summer, and mixes completely in the fall, winter and spring. By mid-summer, solar hearing warms the upper level, or epilimnion, to 20-26°C. The epilimnion averages about 10 meters (33 feet) deep. The deeper layer, the hypolimnion, remains cool in the summer, usually well below 18°C. The transition zone between the epilimnion and hypolimnion, the metalimnion, or thermocline, is shallower in the southern portion of the Lake than in the deeper northern part of the Lake. The shallow lateral lakes along the St. Joe River do not strongly stratify, except for Chatcolet Lake, the deepest of the lateral lakes, and, to a lesser extent, Round Lake. The Project's maintaining the summer Lake level increases overall depth in the summer, but does not affect these basic stratification processes in either the deep main body of the Lake or the shallow southern area. (Exs. B-3 at 16-18, A-33 at 15; A-77 at 8; Tr. 511-513).

28. The growth of aquatic plants is limited by the onset of freezing winter weather, which causes those plants to die each season. The drawdown of the Lake exposes some aquatic beds to the air. (Tr. A-1 at 12).

Ultimate Finding of Fact

Operating the Project to maintain the summer Lake level affects plant growth and distribution, primarily by increasing the depth of water during the growing season in shallow areas of the Lake, creating large areas of aquatic bed wetlands and deep water that would not exist under natural conditions, while decreasing the areas of emergent, shrub-scrub, and forested wetland habitat. The operation of the Project also increases the water temperature and reduces dissolved oxygen in the summer in the shallow lateral lakes along the St. Joe River. These effects are significant in those shallow areas, but are largely absent or negligible in the deeper waters of the Lake proper to the north.

Discussion

The parties' arguments concerning the water quality issues centered on the validity of the CE-QUAL-W2 Model results obtained by Avista's contractor, Golder, and reviewed by Avista's witness, Dr. Scott Wells. Dr. Xiaoqing Zeng, on behalf of BIA, vigorously criticized the W2 modeling effort. The modeling process and Dr. Zeng's main criticisms are stated above in the Supporting Findings of Fact. It will not be necessary to discuss the Model and its limitations in great detail here, however. This is because, in the end, the Model results did support, to a significant extent, BIA and the

Tribe's contention that the Project raises water temperature and decreases DO in the shallow areas of the southern end of the Lake.

Overall the record shows that the Golder modeling effort followed the proper protocols and produced a reasonable approximation of actual conditions in the Lake. This is all that can be expected of such a model. The modeling fulfilled the purposes as requested by the Water Resources Work Group. Dr. Zeng's criticisms are largely vitiated by his lack of experience with the W2 model and his failure to run the Model to verify his points. He also did not show that the proposed use of the Milfoil model to input macrophyte data would have had a potentially significant effect on the ultimate results. While the latest version of the W2 Model now has a macrophyte module, it was not available in 2005 when Golder performed the modeling task. Even if were available, the evidence in the record, from the Tribe's own Aquatic Vegetation Survey, supports Dr. Wells' point that nutrient loadings from macrophytes are relatively insignificant compared to inflow from the St. Joe River. (Ex. B-67 at 22).

In any event, the Model results did show a significant increase in summer water temperatures, and a decrease in DO, in the lateral lakes along the St. Joe River. This is consistent with the more qualitative testimony of BIA's chief witness on this subject, Dr. Falter. Although they criticized the Model, BIA witnesses accepted its results in other parts of their testimony. (See, e.g., Dr. Falter, Ex. B-3 at 16-17).

As Dr. Falter and other BIA and Tribal witnesses emphasized, the increased depth in the shallow areas caused by the Project in the summer has caused a major shift in wetland habitat from emergent and shrub-scrub to aquatic bed and open water. This inundation alone has indisputably had a significant effect on aquatic plant growth and distribution, as Avista has stated in its own Preliminary Draft Environmental Assessment (Ex. A-12 at 5-188, 191). Thus, regardless of whether it is considered a beneficial or detrimental effect, plant growth and distribution patterns have been changed by the Project to a significant extent in the shallow southern end of the Lake. The further implications of this habitat shift will be considered in relation to the issues of eutrophication (Issue 3b), aquatic weeds (Issue 6a), fisheries (Issue 5), wetlands (Issue 7), and erosion (Issue 2).

The credibility of the testimony of Avista's witnesses Drs. Wells, Goudey, and Chapman was somewhat undercut by their repeated and imprecise use of the word "negligible" to describe effects of maintaining the summer Lake level. (Exs. A-1, A-2, and A-3). Under cross-examination, Dr. Wells refused to provide any useful definition

of the word. (Tr. 32-34). Drs. Goudey and Chapman at least provided a definition, to the effect of "too small to measure." (Tr. 132, 191). A standard dictionary definition of "negligible," is "so insignificant as to be unworthy of consideration." Webster's II New Riverside University Dictionary (1984).

A temperature increase of 2.4°C, even for a short period in one location, is not negligible under any definition. It certainly is easily measurable. The Golder modeling report itself did not characterize the model's predictions of the Project's effects on temperature and DO as negligible, while it did so characterize the results for other parameters (nitrates, ammonia, and pH) where the results did not show measurable effects from Project operation. The report forthrightly stated that "[m]odeling results indicate that the HED has resulted in higher water temperatures in the shallow southern portion of the Lake during June to November compared to what might occur under unimpounded conditions." (Ex. A-34 at 38). The transformation of over 2000 acres on the Reservation from emergent and drier wetland habitats to aquatic bed and open water habitats also cannot be considered a negligible effect on plant growth and distribution. That habitat shift can also be easily measured in terms of thousands of acres.

Therefore, the preponderance of the evidence in the record on this issue demonstrates that the Project's maintaining the summer Lake level does create conditions, stemming primarily from increased water depth, that affect aquatic plant growth and distribution. The increased water depth, as shown by Avista's own Model, does increase temperature and decrease DO to a significant extent in the shallow southern portion of the Lake. As agreed by BIA's chief witness on water quality, however, these effects are limited essentially only to the shallow southern end of the Lake, primarily in the lateral lakes along the St. Joe River. (Ex. B-3 at 17). The modeling results, uncontradicted by any other substantial evidence, showed only negligible effects from the Project on temperature and DO in the deeper waters of the Lake to the north. The Project actually increases the volume of cool water in the Lake that complies with IDEQ standards. In addition, as further discussed below in relation to the other issues, these limited effects of the Project do not necessarily lead to the conclusions that the Project causes further adverse effects in a sort of chain reaction, as alleged by BIA and the Tribe.

(b). Whether operating the Project to maintain the summer Lake level causes significant increases in nutrient levels in the Lake, resulting in an increase in overall nutrient loading (eutrophication).

Supporting Facts

1. The Supporting Findings of Fact under Issue 3(a) are incorporated by reference.

2. Nutrients are the products of decaying plant material, primarily phosphorus and nitrogen. They enter the Lake from a variety of sources. The greatest source of nutrients entering the Lake is the inflow from the St. Joe and Coeur d'Alene Rivers, followed by wastewater discharges from around the Lake. Nutrients are also released in the Lake by the decomposition of dead aquatic plants within the Lake and adjacent waters. A study done for the years 1991 and 1992 indicated that the contribution of nutrients from the decomposition of aquatic plants represented between about 1% and 10% of the total nutrient loading into the Lake, not including the southern lateral lakes. (Ex. B-67 at 21-22).

3. Aquatic plants that release nutrients include microscopic algae, or phytoplankton, as well as larger aquatic plants such as epiphytes and macrophytes. Some of these plants begin to die in late August. As senescence continues through the fall, their decomposition consumes dissolved oxygen. This effect is most pronounced in the southern end of the Lake where there is a relatively high density of rooted aquatic plants, due to maintenance of the summer Lake level. (Ex. B-5 at 9-10).

4. DO can also become depleted in late summer and fall in the deep hypolimnion, where the water does not receive any supply of oxygen from the atmosphere. This is a natural effect due to the Lake's stratification, that is unrelated to operation of the Project. (Ex. A-32 at 23).

5. Operating the Project to maintain the summer Lake level does not affect the loading of nutrients from sources external to the Lake, which comprise the vast majority of sources of such nutrients to the Lake as a whole. The Project does increase the area available for growth of aquatic plants, especially in the shallow southern part of the Lake. To the extent additional biomass from those plants die and decompose in the water column and lake bed sediments, nutrient loading in those areas will be incrementally increased. (Ex. B-67 at 27-31, B-259 at 116).

6. When Post Falls HED begins drawdown of the Lake in September, the senescence and decomposition of aquatic plants has begun. That process continues

throughout the fall, as the Lake level recedes. Some of those aquatic plants will therefore decompose on drained areas, where they will not contribute nutrients to the water column. (Ex. A-2 at 8).

Ultimate Finding of Fact

Operating the Project to maintain the summer Lake level does not cause a significant increase in nutrient levels, and does not result in an overall increase in nutrient loading, or eutrophication, in the Lake as a whole. Any minor increase in nutrient loading is limited to the immediate areas of denser aquatic vegetation in the inundated areas in the shallow southern end of the Lake.

Discussion

The undisputed evidence in the record shows that nutrient loading from all aquatic plants in the Lake represents only a minor component of total nutrient loading to the Lake, the vast majority of which enters in tributary inflow. This is shown in the Tribe's own Aquatic Vegetation Survey (Ex. B-67) and the 1997 USGS Woods and Beckwith Report (Ex. B-259). Although those figures did not include the shallow southern end of the Lake, the authors accounted for that in still expressing confidence in the overall conclusion. This conclusion accords with the testimony of Avista's witnesses Drs. Wells, Goudey, and Chapman. BIA's witness Dr. Falter conceded this point, although he emphasized the potentially greater effect of aquatic plants in the southern end of the Lake. (Tr. 485-488). His points do not however alter the overall conclusion that the Project does not significantly contribute nutrient loading to the Lake, except to a limited extent in the shallow southern areas.

This conclusion is further supported by the voluminous evidence describing the degradation of tributary habitat conditions in the upper St. Joe River watershed, detailed in relation to Issue 5 on fisheries. Those habitat alterations cause increased sedimentation and erosion, leading to the excessive discharge of nutrients from the St. Joe River into the Lake.

Under the natural hydrograph, there would still be considerable aquatic plant decomposition in the southern end of the Lake that would contribute nutrients to the water column and sediments. The Project's operation has shifted habitats to increase the growth of rooted aquatic plants. Although not quantified, maintaining the summer Lake level has increased the biomass in the southern end of the Lake. The

decomposition of those plants incrementally adds to the already small proportion of all aquatic plants' nutrient loading to the Lake. But since the contribution of all aquatic plants is less than 10% of nutrient loading to the Lake, any addition caused by the Project cannot be considered significant. This is also shown by the shift in the status of the Lake from mesotrophic to oligotrophic over the past 30 years, as nutrient loading from external sources was reduced due to improvements in wastewater treatment and land management practices. These influences dwarf any slight increase in the decomposition of aquatic plants caused by the Project. Although the southern end of the Lake is relatively more mesotrophic than the northern part, the Project has not created that status. The Project may have somewhat increased the biomass in the southern end of the Lake, but it would still be relatively mesotrophic under the natural hydrograph.

(c). Whether Project operations to maintain the summer Lake level have no effect, or a negligible effect, on the amount of metals that dissolve in the Lake.

Supporting Facts

1. The Supporting Findings of Fact under Issues 3(a) and 3(b) are incorporated by reference.

2. One hundred years of mining in the "Silver Valley," in the Coeur d'Alene River watershed, has resulted in the transport of millions of tons metals-laden waters and sediments down that river into the Lake. It is estimated there are some 75 million tons of metals-contaminated sediments on the Lake bottom, mainly in the northern two thirds of the Lake. The primary metals of concern present in the Lake sediments are zinc, lead, and cadmium. These metals are present in levels that could be toxic to fish and wildlife if they are "bioavailable" to living organisms. The median sediment surface concentrations of these three metals in the Lake are at least an order of magnitude greater than EPA threshold levels that are expected to cause adverse effects to fish or wildlife. However, in the water column, only zinc occurs regularly at levels that exceed regulatory limits. (Exs. A-3 at 4, B-6 at 7; B-259 at 8, 49; B-283 at 13).

3. In 1983 the EPA initiated a Superfund remedial action to clean up the mining waste sites in the Coeur d'Alene River watershed. Since the 1980's, the concentrations of metals in the water column have decreased as a result of this effort. The remedial action is taking place only in the watershed, at the source of the metals-contaminated wastes. The EPA is not attempting to remove metal-contaminated sediments directly from the Lake or the banks or bed of the Coeur d'Alene River. (Exs. A-3 at 4, B-5 at 12).

4. Water sampling conducted by federal, state, and Tribal authorities from 1989 to 2002 has generally shown lead and cadmium in compliance with regulatory criteria, but zinc in exceedence. Metals levels are higher in the northern part of the Lake than in the southern end. (Exs. A-35 at 18-22; B-259 at 4).

5. The Idaho Department of Fish and Game has issued fish consumption advisories recommending limits on the consumption of fish caught in the Lake due to elevated levels of lead, arsenic, and mercury in kokanee, bullhead, and bass. However metals in the Lake sediments or water column are not sufficiently bioavailable to be toxic to fish. (Exs. A-3 at 9; B-183).

6. Metals in the Lake sediments are in the form of sulfides and iron oxides. Metals in these compounds can be dissolved into the water column through the process of reductive dissolution, which takes place most readily under conditions of very low DO, or anoxia. In late summer, at the peak time for potential anoxic conditions, the average concentration of DO in the Lake's hypolimnion is over 4 mg/l, well above the 1 mg/l level considered low enough to promote reductive dissolution of metals. Late summer anoxic or very low DO conditions generally occur only in Chatcolet Lake and to a lesser degree in Round Lake, the mouth of the St. Joe River, and other areas at the southern end of the Lake. (Exs. A-3 at 6; A-32 at 21; A-35 at 25; B-259 at 4-5).

7. The metals contamination in the Lake is derived from the Coeur d'Alene River only. There was no significant mining activity in the St. Joe River basin. Therefore, the contaminated sediments are highest at the mouth of the Coeur d'Alene River and in the northern deeper portion of the Lake, where the south-to-north prevailing current has transported them. Metals-laden sediments do extend southward somewhat from the mouth of the Coeur d'Alene River as far as Conkling Point. This is within the northern part of the Reservation, which reaches near the mouth of the Coeur d'Alene River. Further south on the Reservation waters, and in the lateral lakes, there are no metals-contaminated sediments. (Exs. A-35 at 6; B-118 at 140).

8. The only areas of significantly higher nutrient loading, and lower DO, caused by operation of the Project, are located in the lateral lakes along the St. Joe River, which do not have metals-contaminated sediments. The sediments in the northern part of the Reservation in the Lake, near the Coeur d'Alene River delta, have some metals contamination, but DO in that area is not significantly affected by maintaining the summer Lake level. (Ex. A-3 at 6).

Ultimate Finding of Fact

Project operations to maintain the summer Lake level have no effect, or a negligible effect, on the amount of metals that dissolve in the Lake.

Discussion

It is not disputed that millions of tons of sediments contaminated with zinc, lead, and cadmium, lie on the bed of Coeur d'Alene Lake. It is also not disputed that these sediments are derived from mining activity in the watershed of the Coeur d'Alene River, and that the contaminated sediments are therefore located mostly from the delta of that river and to the north, where the currents have transported them. Some of the contaminated sediments do extend southward as far as Conkling Point, which is within the northern part of the Reservation. However, the record shows that the effects of the Project that increase nutrient loading and reduce dissolved oxygen are confined to the lateral lakes and other shallow areas yet further south. Those conditions could facilitate the release of metals into the Lake. But since they don't occur where the metals are located, the Project's maintenance of the summer Lake level does not have a measurable effect on the amount of metals that dissolve in the Lake.

Avista used the output of the CE-QUAL-W2 Model to input values for redox and pH into another model, the PHREEQC geochemical model, to predict the solubility of metals in the Lake sediments. The results showed at most a negligible effect of Project operation on the release of metals, too small to be measured. (Ex. A-35 at 44). The southern part of the Lake, particularly Chatcolet Lake, showed the potential for metals release due to the low DO concentrations there in late summer. However, there are no measurable metals present in Chatcolet Lake sediments. Although the PHREEQ model results are dependent on the W2 Model results, those have been found to be generally accurate in predicting DO and temperature effects from Post Falls HED operation.

Avista showed by a preponderance of the evidence that the measurably lower DO caused by the Project did not occur in the main Lake areas where the metals are present. The testimony of BIA witnesses Dr. Diamond and Mr. Beckwith was couched in possibilities and potentialities. They mainly confirmed the undisputed proposition that the Lake sediments are heavily contaminated and bear monitoring. But they did not substantiate attributing any increase in the release of those metals to the operation of the Project. The dissolution of metals in the Lake depends on low DO. Those small

southern areas with lower DO caused by the Project do not have metals that can be released.

BIA and the Tribe contend that the longer period of inundation caused by the Project facilitates erosion or the leaching of metals from the contaminated sediments in the banks of the Coeur d'Alene River. However, this is only speculation. On the other hand, water quality measurements have shown a steady decline in zinc, lead, and cadmium in the Lake's water column since the remedial action has begun in the Silver Valley source area. (Ex. A-35). This provides further confirmation that the Project's maintaining the summer Lake level has no effect, or a negligible effect, on the amount of metals that dissolve in the Lake.

Issue 3(d): Whether operating the Project to maintain the summer Lake level has any potential effect on the parameters/substances listed in Condition 3(b)(4)-(6) as areas of further study.

Supporting Facts

1. The supporting facts in relation to issues 3(a), 3(b), and 3(c) are incorporated by reference.

2. The parameters and substances that Avista would be required to monitor, under preliminary Condition 3(b)(4)-(6) are: nitrogen + ammonia, nitrite + nitrate, nitrogen, ammonia, total phosphorus, dissolved phosphorus, ortho phosphorus, chlorophyll-a, zinc, lead, cadmium, total hardness, mercury, arsenic, antimony, silver, iron, manganese, copper, zooplankton, phytoplankton, and benthic invertebrates. The monitoring would be required at several locations in the main Lake, as well as Chatcolet Lake and the St. Joe River. (Ex. B-277 at 13).

3. As derived from the preceding supporting facts, operation of the Project could have a minor effect on nutrient loading in the southern portion of the Lake, but not with respect to the main body of the Lake. Thus, maintaining the summer Lake level could only have a potential effect on organic parameters such as nitrogen, phosphorus, chlorophyll, zooplankton, phytoplankton, and benthic invertebrates in those areas in the southern end of the Lake.

4. As indicated above, operation of the Project could not have a measurable effect on the release of metals in the Lake. Thus, there is no potential significant effect

from the Project on zinc, lead, cadmium, total hardness, mercury, arsenic, antimony, silver, iron, manganese, and copper.

Ultimate Finding of Fact

Operating the Project to maintain the summer Lake level does not have potential significant effects on the metals listed as parameters for further study in Condition 4(b)(4-6). The Project may have measurable effects on the organic parameters (such as nitrogen, phosphorus, chlorophyll, and plankton) in the southern end of the Lake at the mouth of the St. Joe River and in the lateral lakes.

Discussion

Dr. Chapman testified on behalf of Avista that the Project's operation to maintain the summer Lake level could have no more than a negligible effect on all the parameters or substances listed above with respect to this issue. (Ex. A-3 at 10-11). In general, this is true. However, as detailed above, the Project does affect plant growth and distribution in the southern end of the Lake. The increased abundance of aquatic bed vegetation may incrementally increase nutrient loading in that area. Although, as discussed in relation to Issue 3(b), the Project does not cause enough incremental nutrient loading to increase eutrophication in the Lake as a whole, these effects could be measurable in the southern lateral lakes area. Hence, the related organic parameters could be affected by the Project in that part of the Lake. As discussed in relation to Issue 3(c), Avista did show that the Project could not have a significant effect on the release of metals.

Dr. Chapman also made the point that BIA's proposed water quality monitoring program would not be able to distinguish Project effects from otherwise existing conditions. This point was also raised in connection with Ex. A-89, an inadvertently disclosed BIA draft of this proposed condition, in which a handwritten notation queried whether the Project's effects could be distinguished. Michael Beckwith, BIA's witness on this issue, testified generally that the information gained from monitoring these parameters would help characterize the water quality and promote sound management of the resource. He was not familiar with Ex. A-89. In any event, the motives behind the monitoring condition, or the question of whether the monitoring program could discern Project effects from background levels, constitute policy issues that are outside the jurisdiction of this court and outside the scope of the disputed factual issue identified for hearing.

Issue 4. Protection of Cultural Resources

(a). Whether Project operations to maintain the summer Lake level have caused an increase in collecting, scavenging, and looting (also known as pothunting) of cultural materials on the Reservation.

Supporting Facts

1. Historically, the Coeur d'Alene people dwelt in permanent and semipermanent settlements around the Lake and along the lower reaches of adjacent river valleys. They used the Lake and related waterways for food, fiber, transportation, recreation and cultural activities. See Idaho v. United States, 533 U.S. 262, 265 (2001). (Exs. B-173 at 6; B-9 at 8; A-41 at 4-33 to 4-34).

2. Entrix, Inc., Avista's contractor, performed a survey of archaeological resources between November 2003 and March of 2005, during four periods of low water. The survey identified a total of 247 archaeological sites within the Post Falls and Spokane River projects, with 230 of those sites located within the Post Falls Project area. Of those 230 inventoried sites, a total of 49 showed impacts from artifact collecting or looting. (Exs. A-39 at 7-8; A-42 at 3-40, App. E).

3. Although the record contains discrepancies regarding the precise number of inventoried sites located within the Reservation boundaries (Tr. 982, 987-89; Exs. B-9A at 4; A-9 at 7; B-8 at 26; T-41 to T-104), of the 64 individual Site Inventory Forms entered as exhibits in the record, 19 of those Site Forms listed looting as an impact agent. (Exs. T-41 to T-104). The Site Inventory Forms also document the existence of looting on Tribal-owned property. (Exs. T-51, T-52, T-55, T-93, T-94).

4. A link exists between intentional looting of cultural sites and exposed shorelines resulting from drawdowns and other periods of low water levels. (Exs. A-7 at 10; A-51 at 16).

5. Avista maintains the Lake level at or near 2128 feet during the summer months. Following the Labor Day weekend, Avista initiates a gradual drawdown of the Lake level until it reaches the minimum-pool elevation of 2120.5 feet. (Exs. A-12 at 3-8, 5-232; A-51 at 3-4).

6. Project operations contribute to ongoing erosion by holding the summer Lake level at or near a constant elevation, causing boat and wind-related wave action to be

UNITED STATES DEPARTMENT OF AGRICULTURE

BEFORE THE SECRETARY OF AGRICULTURE

In re:	)	AWA Docket No. 08-0130
Kathy Grigg,	)	
Respondent	)	Consent Decision and Order

This proceeding was instituted under the Animal Welfare Act, as amended (7 U.S.C. § 2131 et seq.), by a complaint filed by the Administrator, Animal and Plant Health Inspection Service, United States Department of Agriculture, alleging that the Respondent willfully violated the Act and the regulations issued pursuant to the Act (9 C.F.R. § 1.1 et seq.). This decision is entered pursuant to the consent decision provisions of the Rules of Practice applicable to this proceeding (7 C.F.R. § 1.138).

The Respondent admits the jurisdictional allegations in paragraph I of the complaint and specifically admits that the Secretary has jurisdiction in this matter, neither admits nor denies the remaining allegations, waives oral hearing and further procedure, and consents and agrees, for the purpose of settling this proceeding and for such purpose only, to the entry of this decision.

The Complainant agrees to the entry of this decision.

Findings of Fact

(a) Kathy Grigg, hereinafter referred to as the Respondent, is an individual whose mailing address is 17008 Aubrey Long Road, Gentry, Arkansas 70461.

(b) The Respondent, at all times material hereto, was operating as a dealer as defined in the Act and the regulations.

Conclusions

The Respondent having admitted the jurisdictional facts and the parties having agreed to the entry of this decision, such decision will be entered.

Order

1. Respondent, her agents and employees, successors and assigns, directly or through any corporate or other device, shall cease and desist from violating the Act and the regulations, and in particular, shall cease and desist from operating as a dealer without being licensed as required.

2. The Respondent is assessed a civil penalty of $4,000, which is suspended upon the condition that the Respondent, after notice and opportunity for hearing, is not found to have violated this Order, the Act, and the regulations by operating as a Dealer without being licensed as required.

3. The Respondent is permanently disqualified from being licensed under the Act.

4. The Respondent understands that sales through an intermediary are not exempt retail sales.

The provisions of this order shall become effective upon issuance.

Copies of this decision shall be served upon the parties.

[redacted]
Kathy Grigg
Respondent

[redacted]
Robert A. Ertman
Attorney for Complainant

Done at Washington, D.C.
this 26th day of March, 2009

[redacted]
Administrative Law Judge